

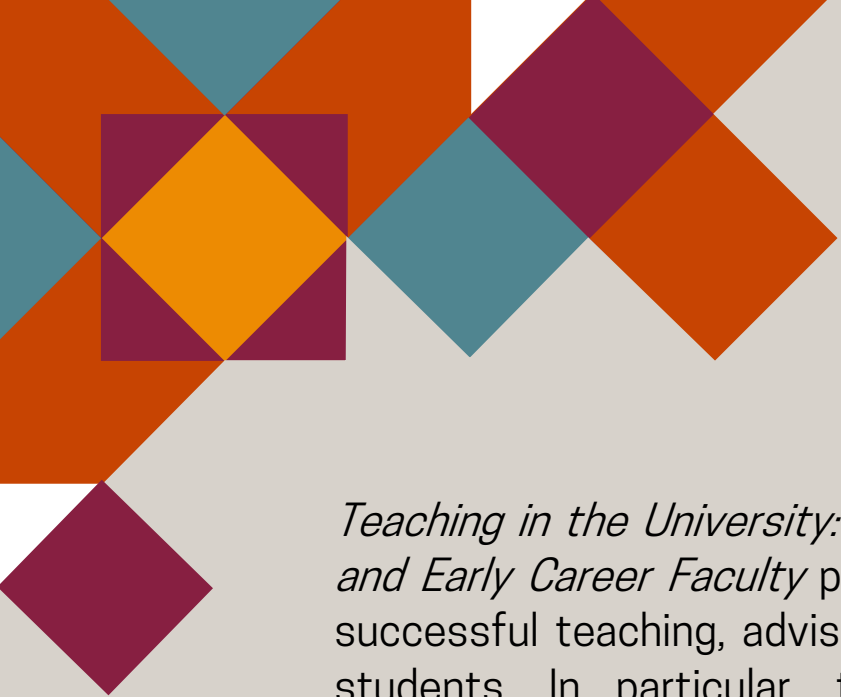


TEACHING IN THE UNIVERSITY

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**LEARNING FROM
GRADUATE STUDENTS AND
EARLY CAREER FACULTY**

Edited by Donna Westfall-Rudd, Courtney Vengrin, and Jeremy Elliott-Engel



Teaching in the University: Learning from Graduate Students and Early Career Faculty provides insight and strategies for successful teaching, advising, and mentoring postsecondary students. In particular, the authors offer support and encouragement for implementing student-centered teaching practices relevant to college classrooms. This book is designed for new university teaching faculty and graduate teaching assistants looking for innovative teaching resources.



As an Open Educational Resource (OER), this textbook provides university instructors free access to high-quality teaching materials based on the experiences of fellow new instructors. Twenty contributors and two co-editors from the current students and alumni of university teaching scholars programs offer this resource for fellow faculty and graduate students to improve instruction and engagement. Each chapter and vignette come from the experiences and expertise of these talented individuals who speak directly to their peers.



In association with

VIRGINIA TECH
PUBLISHING

Cover design: Kindred Grey

ISBN: 978-1-949373-48-6

DOI: <https://doi.org/10.21061/universityteaching>



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Teaching in the University

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Learning from Graduate Students and Early Career Faculty

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Donna Westfall-Rudd

Courtney Vengrin

Jeremy Elliott-Engel

PDF AND EPUB FREE ONLINE AT: [HTTPS://DOI.ORG/10.21061/UNIVERSITYTEACHING](https://doi.org/10.21061/UNIVERSITYTEACHING)



VIRGINIA TECH COLLEGE OF AGRICULTURE AND LIFE SCIENCES IN
ASSOCIATION WITH VIRGINIA TECH PUBLISHING

BLACKSBURG, VIRGINIA

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Suggested citation: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

Publisher: This work is published by the Virginia Tech College of Agriculture and Life Sciences in association with Virginia Tech Publishing, a division of the University Libraries at Virginia Tech.

Virginia Tech College of Agriculture and Life Sciences
250 Drillfield Drive
Blacksburg, VA 24061 USA
<https://www.cals.vt.edu>

Virginia Tech Publishing
560 Drillfield Drive
Blacksburg, VA 24061 USA
<https://publishing.vt.edu>
publishing@vt.edu

Peer review: This book has undergone blind peer review of chapter abstract proposals and editorial review.

Accessibility statement: Virginia Tech Publishing is committed to making its publications accessible in accordance with the Americans with Disabilities Act of 1990. The Pressbooks, PDF and ePub versions of this text are tagged structurally and include alternative text, which allows for machine readability.

Publication cataloging information

Names: Donna Westfall-Rudd, Courtney Vengrin, and Jeremy Elliott Engel, eds.

Title: Teaching in the university learning from graduate students and early-career faculty / Donna Westfall-Rudd, Courtney Vengrin, and Jeremy Elliott-Engel (eds).

Identifiers: ISBN 9781949373486 (PDF) | ISBN9781949373493 (paperback) | ISBN 9781949373837 (ePub) | ISBN 9781949373479 (Pressbooks)

Subjects: LCSH: Graduate teaching assistants – Training of. | College teachers – Training of. | College Teaching.

Classification: LB2335.4 \$b .T43 2022

DOI: <https://doi.org/10.21061/universityteaching>

Pressbooks: <https://pressbooks.lib.vt.edu/universityteaching>

Illustration and cover design: Kindred Grey

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About the Editors

The editing team is composed of the program director, Dr. Donna Westfall-Rudd, and two previous teaching assistants for the Graduate Teaching Scholars program within the College of Agriculture and Life Sciences (CALs) at Virginia Tech: Dr. Courtney Vengrin was part of the first cohort of Scholars who created the program, and Dr. Jeremy Elliott-Engel conducted the first extensive evaluation of the program as part of his assistantship. This collective work informed the continued development and improvement of the program.

Donna Westfall-Rudd, Ph.D. Planning and teaching formal and nonformal educational experiences for adults in agriculture is my passion! While I was a high school agriculture teacher in upstate New York I served three years as part of a group of teacher leaders who planned and conducted the annual professional development programs for agricultural education teachers. I really enjoyed being a part of the planning work and this interest guided my decision to leave the high school classroom after seven years, to serve as the State Coordinator for Agricultural Education. During my ten years as state coordinator I worked with a group of teachers and state staff to design and implement a number of professional development programs to address the needs of new and experienced agricultural education teachers. I am very thankful that I am able to continue working with program planning as a part of my faculty responsibilities in Agricultural, Leadership, and Community Education at Virginia Tech. In 2012 I was appointed the Program Director and Senior Faculty Scholar for the new [Graduate Teaching Scholars Program](#) (GTS). I've worked collaboratively with the GTS students, and their faculty mentors to create this very unique three-year program for doctoral students from across the departments in CALs. Acceptance in the program is competitive and is designed for graduate students who want to focus on developing their teaching skills along with their research knowledge and skills.

Courtney Vengrin, Ph.D. I serve as the Senior Director of Assessment of the International Council for Veterinary Assessment (ICVA). In my role, I conduct research on assessment practices, conduct a variety of data analyses, and develop data visualizations. I am originally from Southwest Virginia, where I earned a B.S. in Biology at Radford University, and then an M.S. in Agricultural Extension Education and a Ph.D in Agricultural Leadership and Community Education at Virginia Tech. Following completion of my Ph.D., I was a postdoctoral research fellow who specialized in academic assessments working under the Vice Provost for Undergraduate Academic Affairs at Virginia Tech. Upon completion of my postdoc, I relocated to Ames, Iowa to become the Coordinator of Assessment and Faculty Development at Iowa State University's College of Veterinary Medicine. During my time at Iowa State, I worked to reshape the assessment and faculty development services offered and created the office of Curricular Assessment and Teaching Support services, where I was named Director. I am the 2020 recipient of the Frederick Douglass Patterson Diversity and Inclusion Award at Iowa State University's College of Veterinary Medicine and I was recently selected as one of the 12 most impactful women on Iowa State's campus.

Jeremy Elliott-Engel, Ph.D. As a young person I joined 4-H where I grew in my knowledge of agriculture but also became interested in sharing this knowledge with my peers and 4-H families. I organized clinics and workshops across my project areas. This was my first introduction to non-formal education. This interest for improving people's lives through knowledge transfer, even as the areas of interest have morphed from the topic of animal science to youth development, has been constant across my professional Extension education career. I completed a Ph.D. in Agricultural, Leadership, and Community Education at Virginia Tech after serving as the teaching assistant for Graduate Teaching Scholars. I currently serve as Arizona Cooperative Extension Associate Director—4-H Youth Development and Associate Extension Specialist in Agricultural Education, Technology, and Innovation with The University of Arizona. Originally from Upstate New York I earned a B.T. in Agricultural Business Management from S.U.N.Y. Cobleskill and M.A.T. from Cornell University. I worked with University of Missouri Extension as a 4-H Youth Development Regional Specialist in Newton, McDonald, and Barry counties.

Contributors

Hannah Angel, M.S. Currently, I am a graduate teaching assistant in the School of Plant and Environmental Sciences at Virginia Tech (VT). I started my assistantship in the fall of 2017. Following in Emily Ott's footsteps, I became the lead TA of Soils Laboratory in the fall of 2018. As Emily worked toward finishing up her doctorate, she trained me on the setup for each activity for Soils Laboratory. These labs vary in design, but all include hands-on exercises, primarily in the lab room but with a few outdoor field trips. While completing my Master of Science in Forestry at Stephen F. Austin State University, I taught Dendrology for six semesters. All labs were taught outdoors, either on or off-campus. I gained experience leading groups of students in an outdoor environment with various distractions and weather conditions. As a graduate student at VT, I learned how to adapt my teaching style to a medium-sized indoor lab room. Soils Lab is unique in that it involves a combination of lab and field activities and projects and requires the help of several TAs due to a large number of sections per week.

Ghadir Asadi, Ph.D. I am an Adjunct Professor at Radford University. I received my Ph.D. in Economics from Virginia Tech. During my graduate studies, I had the chance to teach multiple courses of different class sizes. I had my first experience in teaching large classes in the third semester of my teaching journey. Standing in front of 280 eyes, it was the time that I realized my engagement techniques were not suitable for a class of 140 students. I started searching for methods to help me keep my students engaged and interested. I found a few tricks involving technology. I am trying to summarize parts of my findings here.

Anne M. Brown, Ph.D. From a young age, I have maintained a passion for the sciences and for serving my communities. Uncovering the unknown, making connections across topics, and building community continues to keep me excited to be a scientist and an educator. I earned a B.S. in Biochemistry and Physics at Roanoke College and completed my Ph.D. in Biochemistry at Virginia Tech. I am currently an Assistant Professor and Science Informatics Consultant at Virginia Tech, where I lead a lab of 40+ undergraduate research students. I teach computational biochemistry, research methods, and data science while researching computational modeling and drug discovery for various diseases. I found a passion for working with undergraduate research

students during graduate school and used it as a springboard for innovating and synergizing both my research and teaching missions as I became a faculty member.

Courtney A. Crist, Ph.D. My first exposure to Extension was through my mother as she was a master gardener and took classes through Extension. It was not until college when I learned more about the scale and scope of Extension work and the role of Extension in serving stakeholder needs. As an undergraduate and graduate student in food science, I worked with Extension faculty and assisted with the development and facilitation of Extension activities ranging across curriculum development, publications, programming, and training. Through these unique opportunities, I grew an appreciation for the role of Extension through extending knowledge and thereby changing lives. The power of Extension resonated as we are the nonformal educators making an impact in our community, state, industry, and nation by bringing technical assistance and knowledge where it can improve people's lives. I am currently an Assistant Extension Professor in the Department of Food Science, Nutrition and Health Promotion at Mississippi State University.

Nasim Ebadi, M.S. I graduated from Virginia Tech with a master's degree in Agricultural and Applied Economics. I had the opportunity to join the Graduate Teaching Scholarship program at the College of Agriculture and Life Science. As part of the program, I had to teach a course of my choice at the undergraduate level. As an international student, I was aware that engaging students is hard due to potential language and cultural barriers. I used the advantages of technology to strengthen my teaching style and guard against my potential deficiencies. I planned each session in such a way that I use the most relevant technology in action. Moreover, I added different sources such as interesting animations, in-class assignments using Microsoft Excel, and external links. Using technology helped me to become more focused on teaching and less concerned about the possible constraints. My students were focused, more engaged, and happier as well. I co-authored a chapter to share my successful experience with the readers.

Javier S. Garcia, Ph.D. As an undergraduate student, I had the opportunity to be an undergraduate teaching assistant. I enjoyed working with students, especially helping them understand the concepts of animal husbandry and developing their hands-on skills with livestock animals. While working on

my Ph.D. I was allowed to further develop my teaching skills through the Graduate Teaching Scholars program. I became interested in relational teaching as a graduate teaching assistant and experiencing it in high school. I learned a lot from my instructors and built a foundation for my teaching on what I saw displayed before me every weekday. Believing that the classroom should be a fun learning environment, developing good instructor-student relationships is a key component in achieving that classroom atmosphere. I am now a Research Associate with the United States Department of Agriculture Research Service, U.S. National Poultry Research Center, in Athens, GA.

Gordon Jones, Ph.D. I came to my understanding of agriculture through family, teachers, and supervisors at summer jobs. It struck me that some of these mentors had a real knack for communicating clearly, explaining complex subjects simply, and connecting the task at hand to the bigger picture. As I pursue a career in Extension education, I remember those effective mentors, and strive to make my teaching clear, simple, and well-connected to the wider world. I completed a Ph.D. in Crop and Soil Environmental Sciences at Virginia Tech. Now, I am an Assistant Professor of Practice for Commercial Agriculture in Jackson and Josephine Counties with Oregon State University Extension.

Qualla TW Ketchum. I am a citizen of the Cherokee Nation and grew up within the Nation's boundaries in what is also known as northeastern Oklahoma. My technical background is in Biological Systems and Agricultural Engineering and I am a current Ph.D. student in Virginia Tech's Engineering Education department. My contributed chapter stems from my experiences as both an Indigenous student and Indigenous instructor at predominantly white research institutions. I hope to be part of institutional and systemic change that incorporates Indigenous knowledge and worldviews into STEM education. My work is also inspired by my family—both the generations before, particularly my parents who fostered a love of life-long learning and curiosity, and the generations to come, including my son.

Rachel Mack. I am a Ph.D. candidate in Virginia Tech's Department of Agricultural, Leadership, and Community Education. My research interests include leadership, horticulture, law, and policy. I am always interested in learning new ways to be a more effective teacher. I am a recent graduate of the Graduate Teaching Scholars Program. I enjoy teaching online and in-

person lecture courses, but one of my most memorable teaching moments comes from teaching labs. I once had a lab student who nervously turned in a blank quiz response. I returned his paper and asked him to try again. Composing himself, he remembered the answer!

Chris McCullough, Ph.D. While I was destined for a career as a stand-up comedian, I found that teaching was more enjoyable than getting produce thrown at me. As I have continued to teach, I've been learning how much of my sarcastic, dry humor to let out in the classroom. I know that humor is how I make myself comfortable in situations, but it isn't always professional. I want to create a welcoming classroom, but I also want students to come prepared to learn. For better or worse, I'm figuring out how to present myself in a professional manner in the classroom that also allows me to be who I am.

William Moore, Ph.D. In 2010, I was asked to teach a microbiology class as a graduate teaching assistant at Fort Hays State University. It was during this first year of teaching that I first witnessed a student have a proverbial "aha" moment. The art of teaching has been a joy to my soul ever since. As a doctoral student at Virginia Tech, I was afforded the opportunity to receive formal education in pedagogy as a Graduate Teaching Scholar in the College of Agriculture and Life Sciences. The mentorship tendered through that program was invaluable in my development as a career faculty member. I have certainly had my share of failures and successes as an academic, and it is my hope that my contributed chapter will allow new faculty members to learn from these experiences and to be empowered to achieve early success in academia. I currently serve as an Associate Professor in the Department of Biology and Chemistry at Liberty University.

Emily Ott, Ph.D. I completed a Ph.D. at Virginia Tech in Crop and Soil Environmental Science and had a teaching assistantship for the entire time. Graduate students in the department I was in had either a research assistantship or a teaching assistantship. Those with a teaching assistantship were required to teach 20 hours a week. For about three years I was lead TA for Soils Lab, which typically included about five TAs every semester. When I first became the lead TA, I started making some changes to the lab course, such as rewriting our lab manual and notebooks. For my semester as Instructor of Record for Soils Lab, I made a set of grading rubrics for TAs, and I did a new final project for students. In my first two years of graduate school, I completed the Future Professoriate Certificate. During the last three years

of my graduate program, I was a Graduate Teaching Scholar. I am invested in excellent teaching and my students' success. Along the way, I found some things that worked and encountered some frustrations. I hope that our chapter combines my and Hannah's experience with our background and learning through the Graduate Teaching Scholars Program to help current and future college laboratory instructors.

Bethany Wolters, Ph.D. I completed my Ph.D. at Virginia Tech in Crop and Soil Sciences in the School of Plant and Environmental Sciences. I decided that I wanted to teach at a university after being an undergraduate TA in the Soils lab at University of Tennessee at Martin. My first year in the Graduate Teaching Scholars Program I was a TA in Soil Fertility, an upper-level lecture course, and noticed that despite the students' excitement and interest in the topic at the beginning of the semester, after a few months they were disengaged, overwhelmed, and uninterested in soil fertility. It was my goal to create the same hands-on, engaged learning in the Soil Fertility lecture course that I saw in the Soils lab. I was inspired by Dr. Mark Williams at Virginia Tech who used active learning in his lecture class and coined the term "Fun Fridays." Over the next two years, as a co-instructor and an Instructor of Record, I created hands-on learning lessons for every Friday of the semester. I also was a co-creator and co-instructor for Applied Agronomic Topics in the Mid-Atlantic, a new online graduate course, and I tried to find ways to bring similar hands-on and authentic learning to an online format. Almost a decade after my first teaching experience, I am now the professor teaching Soils lab at UT Martin, with the help of great undergraduate TAs, and am excited to share my experiences with them and with you. Feel free to "graft" any of my teaching ideas into the tree of your teaching practice.

Acknowledgments

Publication of this book was made possible in part by the Open Education Faculty Initiative Grant program of the University Libraries at Virginia Tech. <http://guides.lib.vt.edu/oer/grants>

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Layout, Accessibility, and Typesetting: Leah Hamilton

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Introduction

Here you are, either starting your graduate program or having landed your first academic job. As a graduate student or early career professor you might be expected to teach, either by leading a course for the first time or serving as a teaching assistant (TA) giving class lectures or facilitating laboratory activities. You may not have had any prior experience in teaching, which can result in high anxiety.

Those holding academic faculty positions within a college or university are expected to be active in teaching, discovery, and outreach. Doctoral education programs have historically emphasized preparation for research, scholarly publications, and outreach. To address this long-standing challenge for graduate students, one college's administrative leadership and faculty decided to create a program to better prepare students for their assistantship responsibilities and future career interests as college faculty. The primary objective of the [Graduate Teaching Scholars Program](#) (GTS) in the College of Agriculture and Life Sciences at Virginia Tech is to prepare interested doctoral students for a rewarding academic career. The three-year, cohort-based program was created through participatory pedagogy. Students and the faculty director worked collaboratively to establish the objectives for each of the six associated courses and determine the significant program elements (Elliott-Engel & Westfall-Rudd, 2018). Each year the [GTS course syllabi](#) are updated based on the program scholars' needs and the current teaching trends in the academy.

The program scholars contribute to the college as instructors for courses in their home departments. Over time three new courses have been developed by scholars in partnership with faculty mentors. In addition to the standing activities in the program, scholars also serve as representatives on the college committee to select the outstanding senior undergraduate, and teach courses in the university's summer program. In the summer of 2020, multiple scholars worked with college leaders to assist faculty struggling to convert their courses to synchronized or asynchronous modalities.

This book is created based on the needs of students enrolled in the program. As students and faculty searched for affordable teaching resources to meet the needs of graduate teaching assistants, they found that it was not easy to find one resource that met their many needs. Over time program

alumni and current students realized that they could write the book they sought to find. The group is excited about the opportunity to offer this textbook as an Open Educational Resource (OER) to allow all graduate students free access to the materials. It is exciting to see the twenty authors and two coeditors from the current and alumni of the GTS program sharing their experience from their graduate teaching and first employment opportunities. Each of these chapters comes from the experiences and expertise of these talented individuals who are excited to speak directly to their peers through their shared experiences and advice.

Now complete, the book will be used as a foundational resource for the GTS classes. The experiences of writing an OER item also generated interest in adding OER as an instructional topic to the program curriculum to assist scholars in learning about additional forms of scholarship and the use of OER in their future teaching plans. Other OER topics will include strategies for cocreating OER with undergraduate and graduate students and the economic value of using OER as an alternative to traditional course textbooks. As a new element of the GTS program, there are plans to develop a second volume of this book in two or three years to allow a new group of future students and alumni an opportunity to contribute new ideas and strategies to our collection.

Since the authors and editors are all new to writing a textbook, they decided that the first step in the planning process was to create personas of the anticipated readers. The personas were created by the scholars enrolled in the GTS courses in the spring of 2020 and provided the authors with clear reminders of the diversity of potential readers of their work. This exercise ignited excitement in the group as members realized that the need for this material existed well beyond the scope of the one GTS program on one university campus.

Reader Personas

Persona 1: A first-year faculty member with a 100% teaching appointment and no previous teaching experience beyond serving as a teaching assistant in graduate school

Basic demographics	Hispanic male who is 32 years old
Where are they teaching?	A small liberal arts college in West Virginia
Who are they teaching?	Undergraduate students of impoverished backgrounds
Their general teaching practice	<ul style="list-style-type: none">- A combination of lectures and laboratory experiences- Incorporates different pedagogical techniques other than "standard" practices that include more activities and higher student engagement but lacks access to technology beyond PowerPoint
What questions would they like to have answered?	<ul style="list-style-type: none">- How do they get on the "same page" as their students from diverse backgrounds?- How could they tailor their teaching approach from large to small classes?- How do they write assessments?- How do they design a complete course from scratch?

Persona 2: A first-year international masters student

Basic demographics	A female who speaks English as a second language, mostly fluent in English, but worried about connecting with students. She is excited to get teaching experience.
What are they teaching?	A basic, required course in their department at a land-grant university. Teaching a fairly large class of more than 100 students. Some students are engaged, while some just have to be there. It is possibly the first time the students are exposed to this material. In the past, the class has been taught using lectures. The current teacher is only thought of as average by the students.
Their general teaching practice	They want to be more engaged but concerned about power balance in class. The current teacher has been teaching the same way for a long time. They are teaching using mostly lectures.
What questions would they like to have answered?	<ul style="list-style-type: none">- How does she ensure that her language is not a barrier or an issue with the students?- Are there stylistic/cultural differences between their experiences and those of their students in the US?- Is there anything they should know about?- How does she have students respect her as a teaching figure and not as a peer?

Persona 3: New faculty member with a teaching appointment, who lacks prior teaching experience

Basic demographics	From an underrepresented population, she is short, and is a bit of an introvert
What are they teaching?	A minor class with prerequisites
Their general teaching practice	She tries to look confident and competent. She wants students to be engaged. She wants to have an interactive classroom.
What questions would they like to have answered?	<ul style="list-style-type: none">- How does she act to be confident when teaching?- How can she motivate students with low self-motivation?- How should she incorporate different activities in the classroom?

Persona 4: Community college instructor with a 100% teaching appointment

Basic demographics	A transgender female, white, young adult (28 – 40 years old)
Who are they teaching?	Non-traditional students from diverse cultures and ethnic backgrounds, some international students, some students from a local high school. Some students have low social economic status and some are working full-time jobs, including night shifts. There are also students in the class with families.
What are they teaching?	Some of their courses are offered at night and on weekends. The day classes are offered for those students who work night shifts.
Their general teaching practice	<ul style="list-style-type: none">- They are energetic, use PowerPoint, and are very structured.- They also use online course management software.

Persona 5: New faculty member who has recently completed their doctoral program

Basic demographics	Female, early 30's, with minimum previous teaching experience
What is the context in which they are teaching?	She has to teach and do research. She teaches undergraduates and graduate students. She has no budget for teaching activities and she has to come up with a new course. There is resistance from other faculty to implement new teaching techniques.
What questions would they like answered?	<ul style="list-style-type: none">- How does she negotiate with peers/old faculty?- What should she do to get funding for teaching?- How does she implement in class activities?- How does she find and use new and affordable/accessible teaching technologies?- How does she build an environment of trust in the classroom?

Soon after embarking on the development of the book, the editors and authors experienced the challenges of teaching during the COVID-19 pandemic. These challenges included juggling changing expectations of teaching in different modalities, learning how to offer instruction in online formats, and completing the work for this book. In an effort to provide author support and encouragement throughout the writing process, the editors used multiple engagement strategies. To provide more individualized support to a large team of contributors, each of the editors were assigned small groups of authors with whom they were expected to communicate to encourage progress with the writing work and assist in addressing questions regarding content and formatting ideas. The lead editor also provided multiple virtual office hours for contributors in the early months of the project, to allow individuals space to gather and discuss their ideas with others involved in the project. Throughout the project the editing team worked to provide communications recognizing the progress being made and the goals that needed to be achieved moving forward. The commitment and passion of the book editors and contributors is evidenced in the completion of thirteen chapters, in spite of the frequent hurdles that emerged from the pandemic.

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Additional Resources

These following resources for *Teaching in the University* are available at: VTechWorks handle: <http://hdl.handle.net/10919/102307>.

- Free and openly licensed downloadable formats of the text in PDF and epub.
- A link for the interactive Pressbooks version.
- A link to purchase a print copy (sold at cost).

Instructors and graduate students interested in sharing their original teaching resources are invited to do so at: <https://www.oercommons.org/groups/teaching-in-the-university-teaching-resources/10533>.

What is an Open Textbook?

Open textbooks are complete textbooks that have been funded, published, and licensed to be freely used, adapted, and distributed. As a particular type of Open Educational Resource (OER), this open textbook is intended

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I. Relational Learning: Creating a “Working Alliance” in the Classroom

JAVIER S. GARCIA

Introduction

The day has finally arrived; it's the first day of classes. You make your way into the classroom, noticing a couple of students were also early and look as nervous as you do. As it gets closer to the start of class, more students mill into the classroom. You try to converse with some students as you work to get comfortable. Finally, it's time for class to begin. All eyes focus on you as you start to speak and introduce yourself as the course instructor. This is your first time teaching a course, which can be daunting, especially for new faculty/instructors who may not have previous experience teaching.

Developing social relationships within a classroom can have wide-ranging effects on the classroom environment. Rather than establishing the classroom as a dynamic based on power, the instructor's role in the classroom is redefined as a trusted guide through relational learning. Instructors can form meaningful bonds and create a climate conducive to learning when they form working alliances with their students (Meyers, 2008). Relational learning, also known as a “working alliance,” relies on strong

How to cite this book chapter:

Garcia, J.S. 2022. Relational Learning: Creating a “working alliance” in the classroom. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

relationships between educators and their students as well as on establishing rapport in the classroom. This classroom harmony is positively correlated to students' attention, attendance, and satisfaction with the course professor (Benson et al., 2005). By establishing those relationships, students will be able to motivate, engage, and actively participate in their learning. This can be critical in preventing or reducing the likelihood of academic failure.

This chapter will discuss...

- Why relationships in the classroom are important.
- What relational learning is.
- Some strategies to implement or reinforce relational learning in the classroom.

Relationships in the Classroom

Developing positive instructor-student relationships in the classroom has many far reaching effects on the classroom environment, such as supporting students' adjustment to school, promoting academic performance, and fostering students' resiliency in academic performance. Rather than establishing a classroom environment based on power and control, the instructor establishes their role in the classroom as a trusted guide (Rimm-Kaufman and Sandilos, 2011). The instructor and students accomplish the learning objectives of the course by working together. As a result of developing these trusted relationships students become motivated, engaged,

and will actively participate in their learning. This is crucial in preventing and/or reducing the likelihood of academic failure and creating a fun, yet educational, environment.

A working alliance relies heavily on strong relationships between instructors and students and establishes a certain rapport or connection in the classroom (Roger, 2009). The concept of a working alliance is rooted in psychotherapy research and theory, mainly in the psychologist/patient aspect. However, this concept can be applied to the college classroom as well. An individual (student) seeks change and another individual (instructor) serves as the agent of change (Rogers, 2009). In a survey, undergraduates were asked to identify characteristics and behaviors inherent in effective teaching. It was reported that 42% of the student responses were ranked as follows: work ethic and commitment, positive affect, excellent communication skills, classroom creativity, concern for students, intelligence and knowledge, demeanor toward students, humanistic value, high standards for student work, and popularity among students as the top qualities of effective teaching. However, when faculty members were given the same survey, only 7% of the faculty listed the same qualities in their top 10 (Buskist et al., 2002).

Rapport in the classroom has been positively correlated to students' attention, attendance, and satisfaction of the professor and course (Benson et al., 2005; Meyers, 2008). In early childhood education, students in math classrooms with more positive teacher-student relationships reported an increased engagement in mathematical learning and were more willing to help their peers learn new concepts (Rimm-Kaufman et al., 2015). Relational learning needs to be used in combination with other techniques and pedagogy. As a result, it keeps students motivated and engaged in purposeful work.

Keep in mind that relational learning does not mean that the instructor should be friends with their students, but rather, the instructor should have a respectful and supportive relationship with their students. Do not create a persona that you think your students would find enjoyable or likable. Be authentic! Your students will respect you more. In the classroom, use language that is inclusive and respectful. Be mindful of your students and the experiences they might be going through when you see someone struggling in your course. Also, you will find that every classroom has its own

personality. What works for one may not work for another one. Modify your approach as needed, and don't be discouraged. Relational learning is about the tone you set for the classroom.

Diversity

Relational learning fosters a fun learning environment by creating a respectful and supportive relationship between the instructor and students. This environment can be further developed to include diversity and inclusion, but it is up to the instructor to determine how to incorporate this. Using inclusive language is an easy way to incorporate inclusion in the classroom. Allowing different viewpoints on the topic can help everyone feel like they are being heard and have a voice in the classroom. Be sure to remind everyone to be respectful, especially when they might not agree with someone else's viewpoint.

The college classroom itself can be diverse. It might be made up of students from around the country and sometimes from around the world. Many of the students may not know each other and normally wouldn't interact with each other, except that they are attending the same college.

With relational learning, the instructor can create situations where these diverse groups of students can work together, communicate, and learn from each other (Westfall-Rudd et al., 2019). Assigning student groups so that the members are diverse can also aid in further exposing students to different ideas and viewpoints.

Teaching Strategies

Applying relational learning in the classroom does not have to feel like required extra work. This forced application of relational learning appears unauthentic and has the reverse effect in the classroom. As an instructor, one should ask themselves: How would I like to use relational learning in their classroom? What is the outcome expected for using relational learning in the classroom? How much effort and time will I dedicate to relational learning? Don't be afraid to challenge yourself, but do not overwhelm yourself.

Establishing positive and constructive relationships that foster relationship learning is challenging in the large classroom. This will require some creativity and patience on your part (Tanner, 2011). The following are *suggestions* to be applied to your classroom to foster relational learning; do not limit yourself. As the instructor, you will have a better understanding of your classroom and how you would like your classroom to function. I challenge you to be creative and step out of your comfort zone to apply relational learning in your classrooms.

The first day of classes is essential in establishing a relationship between the instructor and students. It is their first interaction. Just remember that each person brings a different personality to the classroom. You must be able to easily flow between different students' personalities as well as upholding your own without the use of a persona. This may be difficult, keeping this in mind should make it easier to keep these interpersonal relationships between student and instructor. On the first day of class, the instructor generally gives an overview of the course, goes over the syllabus, and perhaps goes into some of the course material. This is important as it sets the course's expectations and gives students an idea of what the course will be throughout the semester. However, this possibly is not the ideal setup for relational learning. Something as simple as telling your students a little bit about yourself on that first day, such as where you came from, your educational background, hobbies, pets, and so on, helps your students relate to and feel more comfortable with you.

An example. One semester, I co-taught at a land-grant university in Virginia. The class was Introduction to Animal Science 1464. I introduced myself and made myself relatable with them by explaining that I was once in their position: I was a student in the same classroom, possibly sitting in the

same seats. I then transitioned into where I was from; most of the students were in-state, so the likelihood of meeting a student from the area I was from was highly probable. I recall that one of the students that I was teaching that semester happened to be from my hometown and had gone to the same high school as me. This student would often come to me for questions, help with assignments, or just friendly conversation. The takeaway here? The more relatable I was to them, the easier it was for the students to come to me with questions and concerns with that class. The familiarity often put them at ease, and they were willing to reach out to the instructor.

Having students complete a simple survey about themselves before the first day of classes serves as a fun speaking topic during the course's first day. Questions such as Are you in-state or out-of-state? Where are you from? What year are you? Future career goals? Why are you taking this course? What are you hoping to learn from the course? The survey results will then give you, the instructor, a better idea of the class characteristics. In addition, because you asked about the students' perceptions of the class and their learning objectives, you are better positioned to know the students' expectations about the course. During the first day of the course, the results could be presented in a simple graph or table to give students a better idea about their peers. The instructor may use the results as a prompt for class discussion or as a question-and-answer segment to answer any questions about the course. This exercise aims to get a better understanding of the students in the course and helps develop an open learning environment in which students will feel a sense of connectedness toward their instructor.

A syllabus is also an essential tool in establishing a relationship between the instructor and their students. It provides students with information about the course they are enrolled in. It provides them with important dates and deadlines, the instructor's contact information, and comprises an agreement between the instructor and the students. Nothing sours a relationship faster than a syllabus that is not followed by either the instructor or the student(s). Ensure the office hours detailed in your syllabus are set times when you will be available in your office. Try your best to stay within your set date and deadlines. Unpredictable circumstances can occur from time to time, but make sure to communicate with your students if any changes arise.

Syllabus Development

The syllabus plays a vital role in relational learning as it lays out the students' expectations for the course. As an instructor plans their syllabus, they should be as clear as possible about their intentions for the course. The syllabus establishes the rules of the course and should be used as a reference by students. Typically, a syllabus contains the instructor's contact information, required materials for the course, a tentative schedule for the course, and a list of resources available to students. This gives students an idea of what to expect from the course and the instructor. The language used in the syllabus can set the tone of the course, so in the syllabus, use language that is deliberate and gets the point across but is not punitive. Students should feel like they can contact the instructor if they have questions and not fear being scolded.

Learning your students' names helps develop positive relationships between the instructor and students (Tanner, 2011). Although it is a simple concept, learning a student's name makes the students feel a personal connection with their instructor, which is beneficial in developing your classroom's learning environment. This is a bit more challenging in larger classrooms but can be accomplished with some practice. Having students bring in a large index card with their name or make a name tent (a piece of paper folded in half with the name written on one side that is perched in front of the student) is the simplest way to learn your students' names (Tanner, 2013). Whenever a student has a question, they will raise their hand, and before you call on them to answer the question, look at the name on the name tent. Another simple way to learn students' names is to ask them to say their names before asking their questions. In smaller classes, you can require each student to come to your office during office hours the first

week of classes for a quick 5- to 10-minute meeting to get to know them. As the semester progresses, repeating this strategy sporadically as students complete exams and projects will allow you to engage in discussions focused on student progress in the course. You will also receive feedback on the different aspects of the course. Over time, these strategies will help you learn and remember your students' names as well as build instructor-student relationships.

Another simple strategy to foster positive instructor-student relationships is for the instructor to come to class early. This flexibility in the instructor's schedule opens classroom availability and classroom visibility. Being present 15-20 minutes before the start of the class gives the instructor some time to interact and converse with students or answer questions students may have. These interactions or conversations could focus on the course material, but generally, the interactions or conversations can focus on topics outside the classroom, especially as the semester progresses and students become more comfortable with the instructor. The instructor's facial and body languages are also crucial in students feeling comfortable approaching the instructor, so remember to make yourself approachable. Students can read a room. If your presence is aloof and off-putting, you may turn your students away because of your demeanor. On the other hand, being easygoing and fluid with your classroom style will make it feel more relaxed and comfortable to the students.

Teaching assistants (undergraduate and graduate), if available to the instructor, play an important role in relational learning. A former teaching mentor described graduate and undergraduate teaching assistants (TAs) as ambassadors to the classroom. Undergraduate TAs are generally within the same age range as the students in your classroom and are peers to your students. In some cases, graduate TAs might be the only instructor students interact with. It is important to have them involved in implementing relational learning in the classroom. This will further reinforce the environment you are trying to create in the classroom. Teaching assistants can be a great resource that may pick up on issues you may not be aware of.

The strategies described in this chapter can be applied to classrooms of any size. Relational learning can be modified to fit the instructor's needs and the resources available. Establishing the foundation for relational learning at the beginning of the semester is essential to maintaining that learning environment throughout the semester; once that foundation has been set, it is easy to keep it going. Do not be discouraged if a strategy for incorporating

relational learning in the classroom does not work or does not have the desired outcome. It requires some trial and error, along with patience. When relational learning is effectively applied in the classroom, the results are a lot of fun. The learning environment is very enjoyable not only for the students but also for the instructor. Students invest more in the course, playing a larger role in their learning and collaborating with the instructor to achieve their course goals. Relational learning is beneficial for the learning environment for your classroom and the students, as they become more active in their own education as they progress through college.

Reflection Questions

- What worries you about relational learning in the classroom?
- How are your current communication skills and how can you improve them?
- What are some easy ways you can apply relational learning in the classroom?

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VIGNETTE: Supporting International Graduate Teaching Assistants

SIHUI MA

Graduate teaching assistants (GTA) are the students who are (1) currently enrolled in a graduate school program and (2) assisting faculty or instructors in colleges, universities, and professional schools on teaching or teaching-related tasks. GTAs take on significant responsibilities in undergraduate instruction at large research universities (Gardner & Jones, 2011). These responsibilities might include teaching introductory undergraduate level courses, helping with curriculum development, proctoring exams, assisting students in science labs or during office hours, and grading assignments. According to the U.S. Department of Labor, Occupational Employment Statistics, there were 131,120 GTAs employed in colleges, universities, and professional schools in May 2016.

International graduate teaching assistants (IGTAs) are GTAs who are neither U.S. citizens nor permanent residents. Instead, IGTAs are temporary visa holders. With the sharp increase of international students attending graduate schools in the United States (Figure 1.1), IGTAs play a considerable role in undergraduate education across many disciplines, including agricultural fields (Table 1.1). The diversified perspectives that international students bring into graduate programs in the United States are essential to both maintaining America's leading role in technological innovation and

How to cite this vignette:

Ma, S. 2022. Supporting International Graduate Teaching Assistants. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

preparing the graduates from undergraduate agricultural programs to be competitive in the international workforce. With the increasing global nature of the food and agriculture industry, “diversity skills,” including the ability to work in diverse communities, the possession of multicultural awareness, and the ability to interact with people of different backgrounds, have been identified by faculty in the agriculture field as valuable skills (Blickenstaff, Wolf, Falk, & Foltz, 2015). These were also highlighted as Research Priority Areas by the American Association for Agricultural Education as necessary for agricultural graduates to prepare “a diverse workforce that includes scientists and professionals with knowledge and skills beyond today’s standards” (Doerfert, 2011). It is essential to acknowledge and utilize the global perspectives that international students bring to American institutions.

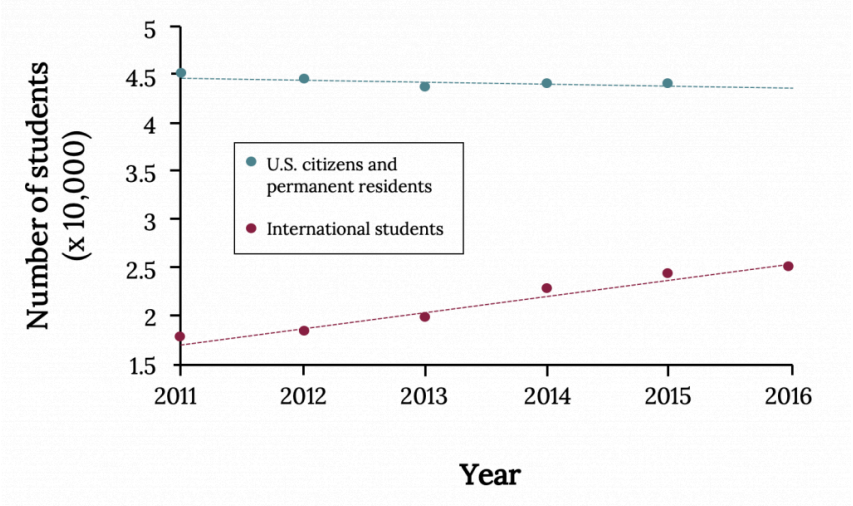


Figure 1.1 The number of full-time graduate students in science, engineering, and health in all institutions in the United States between 2011 and 2016.

Table 1.1 Number and percentage of international graduate students in agricultural-related fields.

Field	Number of full-time international graduate students	Percentage of full-time international graduate students
Agricultural sciences	3940	21.5
Agricultural economics	863	49.1
Agricultural engineering	870	53.5

While IGTAAs play an essential role in undergraduate education in the United States (Gorsuch, 2011), IGTAAs also face many challenges, including difficulties with oral English proficiency, especially communicative competence—that is, understanding students’ questions and responses. Although IGTAAs obtain relatively high scores in standardized English proficiency tests, they still encounter problems interacting with undergraduate students in various instructional settings. This has been a big challenge, often resulting in misunderstandings between IGTAAs and students (Andrea, 1995). Emotional factors, such as the anxiety and stress related to public speaking, and their confidence when communicating with students, influence their pragmatic competence (the ability to use the language appropriately considering the social context) (Aslan, 2016). Current support, which often solely focuses on language proficiency (Fox & Gay, 1994), inadequately prepares IGTAAs for their duties. A shift needs to be made to a more comprehensive training model, which includes understanding academic culture in the United States, the application of English in classroom communication, and interaction with students in various instructional conditions, both in- and outside of the classroom.

Besides the difficulties in spoken language, cultural barriers also lead to the poor performance often exhibited by IGTAAs, which is reflected in the negative evaluations they receive from the undergraduate students in their classes. IGTAAs may face additional stress and anxiety from coping with the difference between the culture of their home country and the United States (Ross & Krider, 1992). This anxiety can prompt IGTAAs to be less willing to communicate with their undergraduate students and teaching mentors, interactions for which English would be the primary language of communication (Roach & Olaniran, 2001). This break in communication may

be negatively interpreted as unwillingness to engage, or a distrust/dislike of students, leading to an inactive and non-engaged learning environment (Nakane, 2007). Also, failure to acknowledge and follow U.S. cultural norms, especially in instructional settings, may result in miscommunication and lack of interaction between IGTAs and undergraduate students.

Training programs for IGTAs need to be developed and enhanced so that IGTAs can better cultivate and strengthen the global leadership skills of undergraduate students with expertise in food and agriculture. Although there are existing on-campus programs and resources to facilitate GTA teaching, there is a need for these programs and resources to be tailored to fit the need for IGTAs. Below are some ideas:

1. Provide opportunities for IGTAs to understand the academic cultures in the United States. Coordinators can recruit current IGTAs, undergraduate students, GTAs, and faculty who work with IGTAs to build an IGTA Representative Group to identify the differences of academic cultures between the IGTAs' home countries and the United States. Collaborators for this effort can include the graduate school, the center for international student services, the teaching and learning center, and the office of student affairs. Findings from the IGTA Representative Group should be recorded and shared with future IGTAs. Understanding and reflecting upon the similarities and differences between academic cultures is vital for IGTAs to set appropriate expectations for their undergraduate students.
2. Provide training for IGTAs on communication skills in various instructional conditions both in and outside of the classroom. Training workshops or courses should be developed to facilitate IGTAs' English communication, such as public speaking skills in formal teaching. The training sessions offer peer learning practices for IGTAs to improve the communication effectiveness among IGTAs, undergraduate students, and faculty mentors in academic settings should be formed. Participants learn with and from each other, contributing as equally valuable members of the cohort (Boud, Cohen, & Sampson, 2014). These practices create a safe environment to practice both speaking and listening. Real connections are made among the participants, which will encourage the participants to communicate with one another.

IGTAs will be paired with native GTAs. The pairs will meet before the class observation to review the lesson plan and discuss specifics on the aspects of teaching that IGTAs aspire to improve. After the peer observation, the pairs will discuss teaching techniques and classroom management. Teaching experience and strategies will be shared, and misunderstandings relating to U.S. academic culture will be clarified. By continuing this practice, IGTAs will gain a better understanding of U.S. academic culture. They will be better able to communicate with undergraduate students, leading to an overall improvement of instructional quality. Native GTAs will also gain knowledge of and insight into cross-cultural communication, observation and feedback processes, and peer-coaching strategies.

The IGTAs' better understanding of U.S. academic cultures and improved communication skills will help IGTAs' succeed in teaching; in turn, undergraduate students will benefit from enhanced instruction. The improved instruction from IGTA's can encourage undergraduate students to embody global the proper mindset to work with others from diverse backgrounds, especially culturally diverse backgrounds (Council, 2009; Suárez-Orozco, 2005; Zигuras & Law, 2006).

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Figure and Table Attributions

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<https://www.nsf.gov/statistics/srvygradpostdoc/>

2. Authenticity

CHRIS MCCULLOUGH

Introduction

It is finally time. You are given your first teaching assignment as a graduate student, or it is time to teach as part of your first job. Sure, you sat through an institutionally required training that seemed to be more about the institution not wanting to get sued than giving you ideas about teaching. You may feel unsure about what to do teaching, or even if you want to teach at all. What and how you teach might be laid out for you already, but you still have the power to decide how to present yourself as an instructor.

You may have encountered a few different instructor personalities during your time as an undergraduate. There is the instructor who struggles to make the content relatable because everyone should get it. There is the TA who is learning the material one week ahead of you because it was the class they were told to teach. You may have had the instructor like the one Robin Williams played in *Dead Poets Society*, who wants to inspire you to greater things. Another person you possibly have encountered is the uninspiring instructor who clearly doesn't want to be there and whose only goal is to get you out the door at the end of class. Finally, you may have had the new instructor who is nervously going through their first experience with the class; but at least they were very personable. An instructor earns many personas. It is important to establish the type of persona you want to adopt as an instructor at the outset. Putting some thought into who you want to be as an instructor can help guide your lesson plans to better suit who you

How to cite this book chapter:

McCullough, C.T. 2022. Authenticity. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

are and help you build rapport with the students. Figuring out who you are as an instructor is an ongoing process that will take time and self-reflection. By figuring out who you want to be, you can use pedagogies that better align with who you are.

This chapter will discuss...

- What cues instructors use to form their teaching identity.
- What it means to teach as your authentic self.
- The benefits and drawbacks of being authentic.

Forming a Teaching Identity

When I taught my first class as the instructor of record, I knew I should not lean into my personality to the fullest extent possible. I know that being funny (I am downright hilarious) is an important part of my identity. It is something I cannot escape, and I choose to embrace. In one of the most serious moments of my life, I was trying to be funny. I was in a car accident about ten years ago. After the emergency personnel cut the car door off with the jaws-of-life, they were about to cut my seat belt. I stopped them and unbuckled myself, and said, “Don’t worry, I got this.” Later, it was reported, the first responders could only laugh. In more personal settings, humor is a preference. Using humor in a professional setting is a challenge as the consequences for bad attempts are more severe. However, humor has its benefits in the classroom, such as reducing anxiety, lightening the mood, and occasionally being thought-provoking (Chiarell, 2010). I try to use this

core part of my identity to my advantage when possible; however, I know it cannot run rampant. Using lots of sarcasm with students, for example, can hurt the instructor's credibility (Banfield et al., 2006).

Two concepts central to this chapter are teacher identity and authenticity, each of which can fill up a textbook on their own. Within identity, there are two aspects of interest, our identity as instructors and the identity we assume when teaching. That is to say, how do we see ourselves as instructors, and what role does that play in our jobs? These aspects of identity are fluid, changing in response to the environment, and changing over time as we grow (Shelton, 2018).

Within academia, instructors are commonly split between the professional identities of researcher and instructor (Kreber, 2010). Do you see yourself as a researcher forced to teach, gaining little fulfillment from teaching? Or, do you enjoy teaching but feel like research, and administrative tasks are viewed as more important? Instructors draw on cues from different levels of the institution to help form a teaching identity. High-level cues come from the institution, the broader culture around education, research-teaching interface, and effort expected (Fanghanel, 2007). Many of these cues are out of an instructors' control but serve to emphasize the value of teaching at the institution. Interpreting the signals of the larger institutional forces is important for understanding what is expected of you as an instructor.

Instructors can draw cues from three levels, high, mid, and personal, to get a better sense of what teaching is like at an institution (Fanghanel, 2007). Most high-level cues are out of an instructor's control, and may offer contradictory signals. The institution may say it values teaching but offer little support and recognition for teaching effectively. There are mid-level cues to draw from within your discipline and or department (Fanghanel, 2007). Within this level, instructors can seek community with others in the department that teach similar discipline topics. New graduate student instructors at Virginia Tech can join the Academy for Graduate Teaching Assistant Excellence to learn from other graduate students at the university about their experiences teaching as a graduate student. In addition to community, instructors may also experience the strongest administrative forces that set job expectations (Kreber, 2010). Finally, at the personal-level, one's beliefs about teaching inform our identity (Fanghanel, 2007). These would include our previous experiences as an instructor and student, our assumptions about students, and what we believe is effective. What is the goal of our teaching? Do we want to convey information or teach skills and

ideas that are beneficial outside of the classroom? While instructors teach content specific to their discipline, many see it as their duty to teach other skills like critical thinking or writing (Kreber, 2010). It is also at this level that the personal identity that we teach is formed.

The first time I was a TA, I taught an introductory insect identification lab. This lab had a reputation for being relatively easy, and most students took the class to meet general education requirements. It was a class many students knew was taught by a graduate student. This class was also an easy assignment for the TA, as the course content and schedule were already laid out. Any changes made were at the TA's discretion, but we could not alter the course content; for example, we couldn't change which arthropod was taught. TAs were not allowed to change the insects on quizzes, but a TA on Thursday could change the order of the questions on quizzes from earlier in the week to keep students accountable. I liked to spice up lectures with any fun or interesting media or information that I could find. For example, did you know the shiny green flies in the family Calliphoridae that bother you when enjoying a picnic are also the ones that provide the larvae used to clean wounds with maggot therapy? It felt more like acting than teaching. I enjoyed the experience, but the lack of ownership always reminded me that I was a graduate student teaching predetermined content. It felt like the student reviews were more about who you were rather than what they learned.

Teaching Authentically

A related concept that pairs with identity is authenticity. Instructor authenticity has emerged as an area of study; the question is, how does instructor authenticity affect interactions with students? Authenticity is a nebulous term that is difficult to define in a scholarly sense, and there are many scholarly definitions of what authenticity is. In a review of the different definitions used, a common theme was being as open as possible about your values, beliefs, and biases (Kreber et al., 2007). Other aspects of many of these definitions relate to showing passion for the course subject, genuinely expressing yourself, and engaging students with topics that matter (Taylor, 1991). In the context of teaching, authenticity is also associated with being kind and sincere with students—it is possible to be an authentically evil

person (Chickering et al., 2006). Considering authenticity along more practical lines means reflecting your values and passion and making an earnest effort to know your students (Kreber et al., 2007). As an instructor, there are many ways to reflect your authentic self through the things that you do in the course.

One way to reflect on yourself is through the assessments that you use. In a class I taught about how ecological principles are applied in agriculture, we frequently discussed what we believed are the best options for agriculture. The majority of students in the course were not in a field related to ecology nor agriculture. However, everyone engages with agriculture on some level, namely choosing what to eat. As part of an assignment on biodiversity, students chose a diet scenario from a paper that they read, then they had to explain why it is the best choice. Each diet has an environmental cost to the production practices that the students had to explain, but they also had to convince their peers why this was the best choice. For me, it was fun to hear about the reasons why students chose the diets they did and to follow-up by asking if their actual diets are reflective of this choice. There were a few vegans who lived out their proposed diet, but most of them acknowledged they did not follow their own proposed diet. This was mostly due to convenience and time. This assessment allowed me to talk to students about a question with no correct answer and provided an opportunity to understand better the values and judgments students make around food.

Lessons that let the students do most of the talking can hide some potentially difficult aspects of your authentic self as well. I categorize myself as more of an introvert than an extrovert. That is not to say that I am fearful of public speaking or being in front of the class. Rather, talking for extended periods is mentally exhausting for me. One of my least proud moments is when I lectured for nearly an hour straight about plant diseases. However, there are times when a lecture is necessary, such as when laying out the organization and relationships of a new topic.

By creating lesson plans and assessments that have the students take the lead, I can reduce the amount of time that I am at the center. However, there are still classes where I lecture. In these classes, I follow a TV schedule. I talk for 8-12 minutes, then ask the students a short discussion question. In total, I try to limit myself to three of these talking periods. That leaves time in the end for some form of assessment as well. This format allows the students to interact with material and provides me a break from talking.

Diversity

Being authentic with the students can help build trust with them. Share your experiences with the students, maybe they have not previously encountered a perspective such as yours. And, by offering your own experiences you give permission for your students to bring their whole self into the learning environment (Elliott-Engel, Amaral, Westfall-Rudd, & Rudd, 2020). The authentic sharing of experience builds trust. By building trust with students, you can help them feel like a part of a classroom community, a place that they would feel comfortable sharing their identities and their lived experiences.

Benefits of Authenticity

Thinking about who you are can help inform your approach to designing your course to maximize your strengths—design assessments and lesson plans that do not require you to be the leader. For one assessment, I had students make infographics to summarize the unit we just covered. I printed out everyone's infographic, with their names removed, of course, and taped them to blackboards in the room. Everyone had an opportunity to write comments next to the infographics before we discussed all of them. I was still able to gauge the students' understanding of the material but to do so in a way that did not require lots of talking from me. Another activity that I enjoy using is having students lead a discussion on a paper reinforcing an important concept from the unit. While I still participate, it gives me a break from being the leader and lets me be an observer.

What if this is your first-time teaching, or you simply want to get through your teaching assignment to get on with your research? Are there some characteristics that you can utilize to get a start and avoid getting negative student reviews? Student evaluations of instructor quality are often tied to the different personality traits displayed by instructors (Kim & MacCann, 2018). Students have their own definition of what it means to be authentic and which traits they associated with being authentic. Students use five broad traits to evaluate the authenticity of an instructor: approachable, passionate, attentive, capable, and knowledgeable (Table 1) (De Bruyckere & Kirschner, 2016; Johnson & LaBelle, 2017). By being organized, providing timely feedback, and clearly relating course concepts, you can fulfill some of the indicators used by students to assess authenticity for being attentive, capable, and knowledgeable (Johnson & LaBelle, 2017). To be thought of as approachable and passionate, students are looking for excitement, for you to share personal stories, and to talk to them outside of class (Johnson & LaBelle, 2017). Having enthusiasm for what you are doing is another common trait described by students as beneficial for instructor authenticity (Keller et al., 2018).

The behaviors that make an instructor seem inauthentic are the opposite of the aforementioned traits: not sharing personal stories or details, not getting to know the students, being bored by the content, being slow to provide feedback, being disorganized, and being unsure of the material being taught (Johnson & LaBelle, 2017). Sometimes, it may seem difficult to avoid these negative behaviors; but, by trying to play to your strengths, you can still be authentic.

Table 2.1 Behaviors students use to assess teacher's (in)authenticity.

Indicators of authenticity		Indicators of inauthenticity	
Approachable	Using personal stories Telling jokes Talking with students outside of class Availability outside of office hours	Unapproachable	Not sharing personal stories Ignores students outside of class Lack of office hours Does not attempt to get to know students
Passionate	Excited about content Enthusiasm for teaching	Lack of passion	Seems bored Not excited to be teaching
Attentive	Listening to students Providing feedback Knowing names Checking in on well-being	Inattentive	Avoids questions Does not know names Does not help students Avoids student feedback
Capable	On-time and prompt Organized Detailed assignments, syllabus, and expectations	Incapable	Unprepared and disorganized Unclear expectations Reading from presentation or book
		Disrespectful	Rude and/or dismissive of students Authoritarian

I was a TA for two sections of a lab for a class called woody landscape plants. The lab was essentially walking around campus and teaching students how to identify the plants they learned about in the lecture portion. This was one of those class experiences where the TA is only a week ahead of the students learning the course material. I know insects, not plants. I took a risk with the students and let them know I was learning the material a week ahead, rather than hide behind an authoritarian streak and tell them what everything was with no room for questions. For graduate student TAs, this can be a strategy when forced to teach a class outside of your expertise. Being honest rather than authoritarian maintains your credibility with the students (Pytlak & Houser, 2014). I also used the students as a resource by having them demonstrate how they remembered the characteristics of the different plant species.

The nature of this lab gave me the chance to talk more informally with the students. We would trek across campus for the lab looking at plants, providing ample time to talk with students. Getting out of the classroom did not require me to be a talk show host. I often asked about the lecture portion of the class. Or, after spring break, we all shared photos of plants that we recognized from class. Once it warmed up enough for insects to become active, I could tie some of my passion into the course content that I was less familiar with. I was always ready to seize the moment and the insect when the opportunity presented itself to bring insects into the discussion. There were some natural opportunities to use insects to enhance the class experience by providing more details about some specific interactions between plants and insects. I pointed out the little balls of fluff on hemlock trees that are the invasive hemlock woolly adelgid. There I was, describing the unique pollination relationship between yucca moths and the yucca plant. The most engaging opportunity was giving everyone a leaf from a boxwood plant and having them split it open to see the boxwood leafminer's larvae on the inside. The students in the class seemed to enjoy these little asides, as it brought the course content back to an area that I am passionate about.

Challenges of Authenticity

Not all graduate TAs may feel the pressure of getting good student reviews. But there may be some who feel pressure to perform for the students to get a good review. Leaning into some of the attributes that students are using to gauge your authenticity can help, but be warned that faking those attributes can have negative consequences—constantly putting up a façade of enthusiasm when teaching class often results in personal dissatisfaction with job performance and emotional distress (Taxer & Frenzel, 2018). Furthermore, if you are bad at acting, people will be able to tell that you are acting differently than you really feel (Grandey & Gabriel, 2015). It might be tolerable to push through a semester of acting to benefit a class as a graduate student with little to no training in teaching. Just know, if you are acting for positive student reviews, you can get those reviews from students at the potential expense of what the students will achieve in your class (Kim & MacCann, 2016). If you are new to teaching and it is a big part of your job, you may want to take a moment to reflect on who you are as an instructor.

One other challenge that comes to mind with trying to be authentic when teaching is what to do with an online course. With more limited means of interacting face-to-face and providing nonverbal cues, expressing who you are can be challenging. I have not taught an online course, nor was I one of the many instructors who had to transition rapidly to an online course due to COVID-19. However, I have had some experiences with online courses as a student. These experiences have taught me one lesson for when I inevitably have to teach online: put yourself on the screen. The courses I have taken have largely been presentations that were narrated by the instructor. I had no idea who the instructors were. I think it is necessary to hold virtual office hours and recitation sessions to allow the students to talk to me to get to know me. Even if you are not comfortable in front of the camera, try to express who you are on the syllabus. Be specific about the reasoning and rationale behind the policies you have. What does it mean to share personal details about yourself in an online class? Another tactic could be sharing social media information with the students, but that may blur the line too much between professional and personal. While you are allowed to share personal views on topics, it can be difficult to disentangle those views because you are an instructor at an institution of higher education. There may also be deeply personal or slightly embarrassing content that students

may not need to know. To choose to share that information with students is your choice. Just be prepared for anything you post potentially come up in class. Being able to express yourself through technology is something that instructors continue to grapple with as more learning occurs online (Shelton, 2018).

Syllabus Development

One of the first places students will encounter who you are is on the syllabus. Be explicit in explaining your rationale for course policies to let students see more of who you are. Instead of a late assignment policy that says you lose a certain amount of points per day late, say you understand that life happens. You are willing to work with a student about what is appropriate, provided they communicate with you. Provide them with a snippet of reasoning about why you have the assessments you do. Let them know the course is about developing them as people, not just students to fill with information. Infographics assignments succinctly summarize the important aspects of a unit; debates are important for picking a position and defending the topic.

Conclusions

When trying to teach as your authentic self, it is important to take time to reflect on who you want to be as an instructor. Developing who we are as instructors is a fluid process that takes time (van Lankveld et al., 2017). Taking the time to reflect on teaching, especially with the support of institutional resources, helps instructors solidify their teaching identity and makes them

more likely to adopt student-centered teaching practices (Nevgi & Löfström, 2015). I consider myself a bit lucky to have had varied teaching experiences and be part of programs during my time as a graduate student to allow me to reflect on who I want to be as an instructor. With every class we teach, we gain new experiences that we can shape ourselves. For example, I had a student who was putting in the bare minimum to get by. Then suddenly, he was gone for a month. He emailed saying a relative had passed away. I was skeptical of that being the case, because he had not done much to earn my trust. Shortly after his return to class, I got a note from the student services office confirming the details of the student's experience. While I never said anything to the student, I had made some bad remarks to fellow TAs. After that experience, I realized I had little choice but to trust students. At best, I get a three-hour window into their lives every week during the semester. The rest of the time, they are dealing with life.

You need to think about who you are as an instructor and how you will express that before, during, and after teaching your course. Before you begin teaching a course, think about how you are going to approach it. Are you going to sequester your identity in an air of professionalism and neutrality? Will you approach a topic from an intersection of your own identities? When you are teaching, moments may arise when you need to set aside or redefine your authentic self. If you have students debate a topic, do you try to remain impartial or show a bit of bias toward the ideas you like? After the course is over and you have read the student evaluations, ask yourself if the comments reflect you or the course content? It may feel nice to read positive reviews of who you are; but, if the class average was a "C," what is that saying about how well you taught? Was your authenticity being perceived as being nice, or did you engage the class with it?

This is the beginning of your teaching journey; do not expect it to fall perfectly into place right away. This is a process that will take time. Before you start thinking about what your teaching persona will be and what your goals are for teaching, talk with other instructors at the institution to learn from their experiences and about what motivates them to teach. Also, seek out other resources that the institution may have to help with teaching. At Virginia Tech, there is the Academy for Graduate Teaching Assistant Excellence. This is a group of graduate students who are willing to share their experiences with all aspects of teaching in formal and informal settings. Finally, take time to reflect on the course and your teaching once it has passed.

Reflection Questions

- What are your motivations for teaching this class? Is the topic an area of passion for you, or is this simply part of your job duties?
- What identities do you possess that could be prominently featured while teaching? Are there lessons that could be designed that allow you to utilize these?
- Are there resources at the institution such as professional development opportunities, teaching groups, or mentors to help you develop your teaching practice?

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Figure and Table Attributions

- Table 2.1 Data Source: Johnson, Z. D., & LaBelle, S. (2017). An examination of teacher authenticity in the college classroom. *Communication Education*, 66(4), 423–439. <https://doi.org/10.1080/03634523.2017.1324167>

VIGNETTE: Structure and Organization to Facilitate Learning in My Large Class During the COVID-19 Pandemic

DIDIER MENA-AGUILAR

On December 2019, I finished my first college-level teaching opportunity, acting as a co-instructor responsible of leading half of the lessons in in-person biochemistry concepts course for more than 270 students. Based on the grades and student feedback, I felt satisfied with my performance. Student's comments highlighted two main aspects of my teaching: They valued my genuine care for students and the highly structured and organized way I taught the course. However, I was well aware of the advantages I had in having a more experienced faculty member assisting throughout the experience; the older professor was the face of the teaching team, and he led most of the logistics and overall planning of the course. I knew that I was going to be the sole instructor of the same course in the fall, and I needed to take my teaching to the next level in a manner that would benefit my students' learning.

It is not uncommon for graduate students to feel overwhelmed at the prospect of teaching a whole class on their own. I asked myself questions about my preparedness and future performance on the course. Will the

How to cite this vignette:

Mena-Aguilar, D. 2022. Structure and Organization to Facilitate Learning in My Large Class During the COVID-19 Pandemic. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

undergraduate students trust a graduate student to teach them on his own? Will I be able to engage the students and facilitate their learning? Could I successfully implement the pedagogy techniques I have been learning in my teaching courses? I knew I had time to prepare, and I comforted myself with my good performance last semester.

However, in early 2020, the world seemed to stop due to the COVID-19 pandemic. Airports shut down, businesses closed their doors, and quarantine orders were imposed throughout the world. Universities were not exempt, and quick actions were taken to transfer in-person courses to fully online. I felt lucky that I did not have to teach during spring 2020, and I assumed the pandemic was going to end quickly, so I did not have to worry about it affecting my future teaching.

However, summer came, and the pandemic was still going strong. Cases were increasing in our little town in the middle of rural Virginia, and it was clear that the fall semester was going to be mainly online. For a course that was expected to have more than 270 undergraduate students, the only possibility was to move the course to a fully online modality. Now the challenge was not only to teach a course on my own for the first time, but also to teach it online. I knew what I did before was not going to be enough, and I decided that the best course of action was to meticulously prepare for it.

The first thing I did was to identify the potential challenges my students were going to face during the semester. I was aware that the weight of the pandemic was not distributed equally throughout the student population. I knew some of my students had more responsibilities outside my course and, thanks to the pandemic, many of them had to face challenges that were unprecedented: Some of them were in different time zones, some of them did not have a quiet space to participate in class, some of them had to work full time to ease the financial hardships, some of them had to take care of their loved ones, some of them were sick themselves.

Online courses were particularly challenging for students who were enrolled at a traditionally in-person university. In a normal semester, they could get away with just showing up to the classroom and catching up with what was happening at the moment. Online courses require higher student awareness of how the course is designed and the logistics behind it. For example, an online course requires the students to properly navigate the course management system, in our case Canvas, that would contain

everything from the materials and the assessments to the link for the synchronous meetings. However, students are not always well-versed in the platform and struggle when encountering a lack of structure on the website.

How could I make my course easy to engage in, uphold the quality standards required by the university, and accommodate the emerging needs of my students? Based on my students' feedback from the previous semester teaching, I knew the highly structured lessons I planned were a strength. I contemplated how I could transfer my perspective on lesson planning to other key aspects of the course.

I carefully planned every step of the course in a way that would intuitively lead to student success. This plan covered aspects from the general progression of the course throughout the semester, to the specific structure of each lesson. For example, I created a template of how the usual lesson was going to look, specifying the responsibilities of the instructor and the students before, during, and after the class meeting (Figure 1). At the start of the semester, I reviewed this template with the students, making sure we all knew what was expected. The key objective of this figure was to give the students confidence by allowing them to be informed and empowered during each lesson.

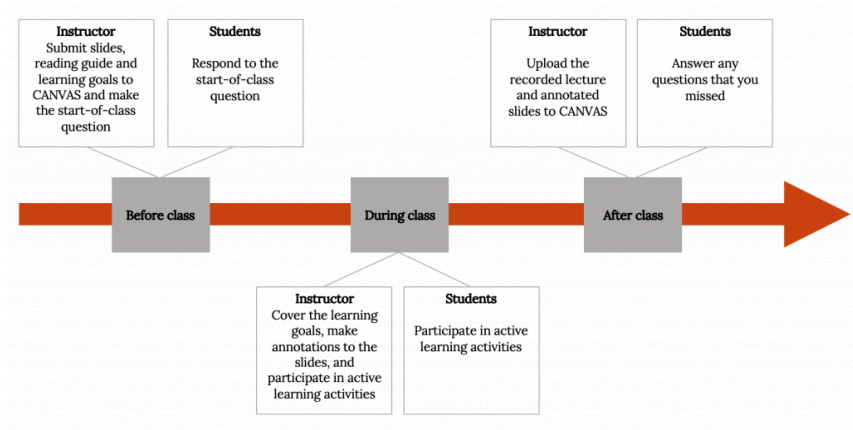


Figure 2.1 Overall plan presented to the students at the start of the semester.

To address the innate challenges associated with the need for technology proficiency in an online course, I tried to make the Canvas site as clean and intuitive as possible. The homepage contained only the key information

that the students needed, including a description of the course, my contact information and links to the syllabus, the schedule, and the Zoom address that we used to meet every week. I made sure the links needed to access the class recordings and assessments were easy to find and intuitive to follow.

I also reflected on the best way to organize the materials needed to study. The course subjects were mainly taught through lectures with incorporated active learning strategies. Each lesson I designed contained a set of documents that included the learning goals, the annotated slides, and the recorded lectures. All of these documents were uploaded to the Canvas site before or right after the meeting session. The key aspect of the organization approach that I implemented in all documents that I uploaded was a carefully designed labeling system.

I assigned a number to each subject based on the chronological order in which they were reviewed. Each document label started with the number assigned to the subject the lesson covered. This way, the learning goals, slides, and recorded lectures could easily be associated with each other just by looking at the label. Since the document names started with a number, they were organized chronologically by default on the website or even in each student's personal file management system. This approach made it intuitive for the students to access the documents when needed.

I implemented these strategies throughout the semester, and I frequently reflection on both their effectiveness and their impact on the students. Based on comments from the class survey, the strategies I put in place helped the students face the challenges derived from the COVID-19 pandemic and concentrate on the goal of the course: learning biochemistry. Furthermore, by having a detailed structure and plan to follow, it allowed me as an instructor to have flexibility to adapt to my own challenges. I think the most valuable component of my teaching experience as a graduate student is the impact I had on my students. The actions I took to be more inclusive and facilitate learning in this unexpected online setting were reflected in the student feedback. I was particularly pleased to receive comments that specifically addressed how the way I taught the course eased the difficulty of online learning during a pandemic by students at a traditionally in-person university:

“We always knew what was expected of us in that class and I appreciate the structure of the class. The structure of the class helped with having the discipline for online schooling.”

“Professor Didier did a great job having all of his material organized on canvas and a great schedule. He made the material easy to understand. I struggle in chemistry, but this has been the best chemistry course and the one I am doing the best in at Virginia Tech.”

“The style in which this course was conducted was exactly what I would want. This was my most organized course and I always knew exactly what I had to do in order to succeed. It was very straightforward.”

Figure and Table Attributions

- Figure 2.1 Kindred Grey. CC BY 4.0.

3. Indigenizing Your Classroom: A Practice in Inclusive Pedagogy

QUALLA KETCHUM

Introduction

Expanding diversity is a national imperative in education as universities work to better serve populations that are underserved in higher education. Education research has shown the importance of students being able to see themselves in their chosen field, particularly for women and students of color (Rodriguez & Blaney, 2020). Representation matters, affecting our students' sense of belonging in our educational areas, departments, and programs. It is an important step as educators to disrupt outdated and colonized notions or structures, even in small ways, to help improve this identity in our students. This change can be done by incorporating inclusive pedagogical practices into our classrooms, including raising the voices and works of those who have historically not been heard in our fields. Culturally Responsive Teaching can help increase student competencies and support diverse students to feel more connected in the classroom environment (Bazron, Osher & Fleischman, 2005). Culturally responsive educational practices are important for a new university educator because the university environment often has a variety of students from many different cultural backgrounds, and knowledge of these practices will help faculty creatively adapt their teaching to that environment.

How to cite this book chapter:

Qualla, K. 2022. Indigenizing Your Classroom: A Practice in Inclusive Pedagogy. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

This chapter will discuss culturally responsive teaching practices, focusing particularly on including Indigenous knowledge, techniques, and voices in the classroom and how doing so will benefit all students, not just Indigenous students. I will highlight examples of experiences of Indigenous people to illustrate the importance of culturally responsive teaching practices, explain culturally responsive practices employed in my teaching practice, and demonstrate how these practices may be included in your classroom in a culturally responsive and respectful way.

This chapter will discuss...

- The experiences of Indigenous people in the United States and their relationship to education.
- What Culturally Responsive Teaching is and how to implement a few culturally responsive teaching practices.
- The value of including Indigenous knowledge and voices within the classroom.

Being Indigenous in the Academy—My Positionality

It is a traditional practice by Indigenous people to introduce ourselves first by our community and people in our language. This practice mirrors recent calls for researchers and educators to be transparent in their positionality as well as their personal history and perspectives, especially when working with Native communities (Canada & Royal Commission on Aboriginal Peoples, 1996; Castagno & Brayboy, 2008; Haynes Writer, 2008). Haynes Writer (2008)

also wrote about the importance of Indigenous perspectives to those outside of the Indigenous community in creating this culturally responsive work, stating:

Our stories and our words are, as well, offerings to non-Indigenous people so they may come to know and move into ally-ship with us for that needed transformative work. (p. 10)

I am Qualla **ƧW** (*qua-la*) Ketchum, and I am a citizen of the Cherokee Nation. I grew up within the Nation's boundaries in what is also known as northeastern Oklahoma. My technical background has been in Biological Systems or Agricultural Engineering. As an Indigenous student, I have had firsthand experience with the struggle to connect engineering to my culture. This struggle has been identified as one of the factors impacting why more Native Americans don't become engineers (Kant et al., 2015). I have had to work hard to bring together these different sides of myself—the engineer and the Cherokee and the educator—and it is a continuing process.

I want to acknowledge my white-privilege as a white-passing Native woman, meaning that others do not immediately recognize my identity as a minority. Because of my phenotype, I am seen by society as white, and thus I carry that privilege. I acknowledge that my experience is not the same as those who are automatically coded as a person of color by the dominant culture. I can only speak for myself and my experience. There are more than 573 different Indigenous Nations within the United States which means more than 573 different cultures, languages, histories, and sets of issues. I cannot speak for other Indigenous nations or even for everyone within my Indigenous Nation. The experiences and thoughts expressed here are my perspective as both an Indigenous student and an instructor. It should not be assumed that all Indigenous people experience the academy or hold the same truths as I do.

As a whole, Indigenous people have had a long, storied history with the US education system. Teaching and learning have always been important values in our cultures, mostly in informal ways through our family systems. As an example, the Cherokee Nation built the first institutions of higher education west of Mississippi for both Cherokee men and women as a way of reclaiming our ways of being after our forced removal to Indian Territory in the mid-1800s (Foreman, 1982). However, education was then turned into a weapon used against Indigenous Nations by the US government. The Curtis

Act of 1898 was used to dissolve tribal institutions of the Five Civilized Tribes, including the Cherokee seminaries (Conley, 2007). This action paved the way for residential boarding schools and the deeply rooted scars that still exist today from this era in Indigenous communities. For many of our Indigenous nations, these schools, where native children were forced away from their families to become “civilized,” were our first real experience with a formal education system. The horrors in these schools haunt many today (NPR, 2008), but these schools are not as far in the past as one might wish to think. In 1969, one-third of Native students were still enrolled in schools operated by the Bureau of Indian Education (BIE). Now, nearly 50 years later, the bureau still educates 40,000 Native students in over 180 schools (NPR, 2008). These schools’ effects on Indigenous families are still felt every day, especially when it comes to feelings toward education. On reservations in Montana, educators and Indigenous leaders have discussed that families do not seem to value or believe in formal education (Field, 2016).

It is with an understanding of these histories and beliefs that the statistics for Native Americans in education become more clear. Native Americans have the lowest graduation rate in comparison to other minority populations. We are the least likely demographic to enroll in college and are the second least likely to graduate on time (Field, 2016). Only seven out of every 100 Native American kindergarteners earn a bachelor’s degree (Begay-Campbell, 2016). Nearly fifty percent of Native American K-12 students attend a public school where the full range of math and science courses are not being offered (Begay-Campbell, 2016). I, personally, went to a public school that fell within this category. This performance gap can also be attributed to a lack of funding, qualified teachers, technology, and internet access (May & Chubin, 2003). From 2005 to 2015, the percentage of 25- to 29-year olds holding at least bachelor’s degrees increased for all racial and ethnic groups except Native Americans (Field, 2016).

I share all of this as a framework for understanding why culturally responsive teaching and inclusive pedagogical practices are important to include in our classrooms. Because of the highly colonized nature of the United States education system and society as a whole, many educators are not aware of this history and experience of Native Americans. We must understand where we have been and where others are coming from when we wish to create and hold welcoming spaces within our classrooms.

Culturally Responsive Teaching: What Is It?

Many new educators have great enthusiasm and commitment to teaching their students well but do not always have the skills necessary for success in the environment in which they teach (McHenry, 2018). Educators also sometimes feel unprepared to teach students of different cultures (McHenry, 2018). This section will explain the purpose and implementation of culturally responsive teaching practices in your classroom.

Culturally responsive teaching builds a cognizance of the value of cultural differences into the classroom and avoids seeing cultural differences as negatives (Morgan, 2009). Culturally responsive education can include the use of culturally relevant examples and assessments and respectful classroom-management approaches (Bazron et al., 2005). Employing culturally responsive educational practices can help students feel a greater sense of belonging in the classroom (Bazron et al., 2005), potentially leading to increased motivation for learning.

Culturally responsive teaching is instructing in a way that embraces the idea that culture plays a role in learning (Harmon, 2012). Students come to the classroom with their unique perspectives, including their histories and respective cultures, such as Indigenous cultures. Students who are a part of a different culture may feel that they do not “belong” in the classroom if references used in the lesson reflect only one group. Using examples that include a variety of groups can help enrich the class and student learning.

It is useful to note that the word “culture” in culturally responsive teaching is used broadly, as cultures can vary within a particular group or system. For example, cultures of Indigenous peoples can be different from one Indigenous nation to another, and while each individual does not necessarily feel qualified or able to speak for everyone in their own nation, much less that of all Indigenous cultures, they may feel prepared to offer their personal perspective on their place within it. Culture can even refer to the culture of a particular geographic area or “culture of place.” For example, the culture in rural Appalachia is different from the culture in an East Coast inner city. Teaching using culturally responsive practices in each of these places would look different (McHenry, 2018). McHenry (2018) notes that moving to rural Appalachia and teaching the children of coal miners was challenging for her, as the students were food insecure and parents were stressed. Having no training in the practice of cultural humility, she states that she decided

that her students simply needed more schooling and didn't understand until much later that while she could drill her students on math facts, she couldn't fill their stomachs or truly understand the "values, behaviors, language, and culture that defined them and their families." Knowing details such as the strengths, values, and challenges of different cultures helps you to tailor your lessons specifically to the students you are teaching.

Cognizance of a historical lens is important when engaging in culturally responsive educational practices (Harmon, 2012). Cultural traditions may be linked to that culture's unique history, which can manifest in your class through differences in the ways students respond to questions, differences in their viewpoints, and differences in their perspectives. For example, Indigenous students sometimes, but not always, express a mistrust of the US government and educational system based on historical knowledge of relations between Native people and the US government, as discussed in the previous section. This mistrust perpetuates both community attitudes toward education and student fears of going away for higher education. This historical context for the US education system can provide greater insight into how different activities and resources will affect other students in the classroom. For example, students from various backgrounds will have different responses to an assigned reading of the "Students' Right to Their Own Language" statement from the Conference on College Composition and Communication. In particular, Indigenous students have described strong reactions to the quotes in the statement about how learning a new dialect of language in the academy is "to some extent a rejection of one's culture." Intergenerational trauma from boarding schools stealing language and ancestral knowledge from Indigenous communities can result in strong feelings arising that would not affect students from other cultural backgrounds. Recognizing and holding space for these students and backgrounds helps students feel more included in the academic environment. It even allows them to gain a sense of empowerment and ownership of their stories (Harmon, 2012).

Interestingly, culturally responsive education does more than empower the students. It empowers educators! Educators who use culturally responsive teaching in the classroom can feel empowered by the exciting sense of being a facilitator in the school, discussions are richer, and true connections are made between people and information (Harmon, 2012). Engaging in culturally responsive teaching practices is fun for the educator

as well! And who would not want to make the class more enjoyable to teach? As an added plus, when an educator is exuding more enthusiasm, that excitement is likely to be contagious for students.

Implementation

There are many different ways to implement culturally responsive educational practices in the classroom. One is to incorporate cultural references into the lessons in the examples used to explain concepts. The use of cultural references can best be achieved by weaving them into the class in a *meaningful* and *intentional* way (Ladson-Billings, 1994). For example, one Indigenous colleague often uses traditional storytelling in her teaching while I explicitly use my Cherokee Community Values to guide my classroom interactions. Many majority identity educators express interest in wanting to share these different references with their students but worry about having something to share or sharing incorrect information. As previously discussed, one's ethnic/racial identity is only one piece of culture. One educator could use their family motto as a way to center different cultural examples holistically. By honestly sharing of themselves and their cultures first, the other examples utilized in class can be received with more power and purpose than those just seemingly tacked on and unconnected to the class.

Another way to incorporate other voices in class is to ensure that other perspectives and accomplishments are included when discussing a particular field's history. For example, the history of STEM (science, technology, engineering, and mathematics) fields is often documented as very Eurocentric, leaving out many other perspectives. Engineering feats such as the Inca Road System or the complex water-drainage systems of the southwestern US nations are frequently left unmentioned while the histories of people in Europe take center stage. Many of the courses taught do not have a discussion of history included in the lesson plans. If such a discussion seems overwhelming or difficult to include, a good first step is starting each class with a quote or person of the week that represents diverse perspectives and accomplishments particular to the field of study. This is another way to use culturally responsive teaching practices to highlight voices that are often

left out of these conversations. A word of caution, however: This step is often best used in conjunction with the previous step of incorporating cultural references. The use of these quotes and references needs to be sincere and thoughtful. Instructors should be prepared to educate themselves during the planning and implementation of this process. Make cultural references part of the lesson structure, or invite students to present examples of their own so that the cultures present in the class may come out in the discussion.

Incorporating culturally responsive teaching into a specific class can feel a little daunting for a new educator at first. The easiest place to start is with getting to know the students and what communities they represent. Having students introduce themselves is a great way to begin to get to know them and better understand their perspectives. In my classes, however, before they speak I first introduce myself in my native language. This shares a piece of myself and my culture with my students—an important step if I want to ask the same of my students. It also helps put any students from underrepresented perspectives, particularly from other Indigenous cultures, more at ease in academia and in my classroom. It is helpful to give space for every voice to be heard in the classroom while also avoiding pushing students to speak up if they are uncomfortable doing so.

Another effective way to incorporate culturally responsive teaching practices in the classroom is to diversify the syllabus. It is important to examine the readings being used in your curriculum. By assigning particular readings, you are inadvertently telling your students which perspectives are important. In culturally responsive teaching, you want to make sure that the value culture has in the classroom is accurately depicted in your syllabus. Including a land acknowledgment statement in the syllabus is another easy way to create a welcoming space for all students in the classroom. For non-Indigenous educators, this simple step works similarly as my introduction in my native language. It is an easy way to put Indigenous students in particular at ease and other students who value inclusion and different cultural perspectives.

An exciting feature of culturally responsive teaching is its focus on the strengths that culture can bring to the learning, and the classroom community (McHenry, 2018). Culturally responsive educational environments may incorporate culturally related music, food, language, or clothing (Eglash, Gilbert, & Foster, 2013). An individual may proudly express these cultural features from a particular culture as aspects of their personal style (Eglash et al., 2013). Incorporating items such as music or food can help

add enthusiasm to your lesson and the classroom, making them a great way to get students more engaged in learning. There are a number of strategies that support culturally responsive teaching.

Syllabus Development

Be intentional with what you put in your syllabus and how it's communicated. Your syllabus sets the tone for the semester and is often your first introduction to your students. What inclusion statements are suggested or required by your institution? Ensure that your use of these statements is intentional and meaningful rather than tacked on at the end of the document out of obligation. Do they connect and align with the rest of your syllabus and how you manage your classroom? In culturally responsive teaching, you want to make sure that the syllabus accurately depicts the value culture has in the classroom. Diversify readings and ensure multiple perspectives are included and valued. Include a land acknowledgment statement at the beginning of your syllabus. Resources for developing this statement can be found at <https://nativegov.org/a-guide-to-indigenous-land-acknowledgment/>

Tips for Culturally Responsive Teaching

- Start class with a land acknowledgment statement and include one in your syllabus.
- Teach to people, not your topic, using student-centered strategies.
- Educate yourself on the historical context in which you are teaching. Ask questions!
- Do a self-assessment of your own vocabulary, responses, and privilege.
- Use culturally related examples to explain concepts or invite students to offer up their models.
- Avoid assuming you know a student's culture. That student may surprise you!
- Make space/time in your lessons for students of different cultures, such as Indigenous students, to speak up if they wish to share.
- Act as a facilitator, rather than a lecturer, for your students

Conclusion

Your teaching, and your students' learning, can benefit from culturally responsive practices. Culturally responsive teaching helps increase students' sense of belonging and creates a welcoming space within our classroom. An awareness of historical context is also important when engaging in culturally responsive educational practices. It helps to understand where both we as educators and our students are coming from before entering the classroom. Indigenous practices, knowledge, and voices can be incorporated into the school through culturally responsive teaching practices, improving learning for all students. Culturally responsive teaching practices can make your class a more dynamic, engaging atmosphere where references to various cultures are used to help illustrate concepts and enrich the lesson.

Reflection Questions

- What did you learn about Indigenous cultures through this chapter? Why do you think you didn't know this before?
- How do you think you can include culturally responsive teaching practices in your own teaching?
- How can culturally responsive education improve your students' learning?
- How can Indigenous culture in particular be incorporated into your teaching to enrich your lessons for all your students?

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4. Teaching Practices for Student-Centered Learning Online

RACHEL MACK

Introduction

Welcome to the online teaching chapter! Teaching online is not only fun, but it also has advantages for both you and your students. In my online teaching, I have enjoyed the flexibility (Bates, 2012) of the online teaching process. While online education can initially seem intimidating to new graduate teaching assistants (TAs) and faculty, if you are feeling overwhelmed by it, you are not alone. Seasoned faculty sometimes have difficulty with online teaching, especially if they are not used to the format. When COVID-19 forced face-to-face classes to become online classes, some faculty and teaching assistants in academia were left scrambling to both meet the needs of students and present their material well (Kamenetz, 2020). Moving a class online can be especially challenging for those who are not well-versed in online teaching tools, or who are accustomed to using lecture-only teaching formats. However, an online course doesn't need to be a challenge to create and implement.

How to cite this book chapter:

Mack, R. 2022. Teaching Practices for Student-Centered Learning Online. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

If you find yourself overwhelmed at the prospect of teaching an online course, you may be overthinking it. There are ways to make your online course simple and useful at the same time. In this chapter, I will walk through the components necessary for a basic, easy-to-implement online course, so that you may quickly set yourself up for the delivery of effective teaching for your students.

In my teaching, I have seen critical thinking elevated by highlighting student questions and interests, which in online classes can make space for student ideas to influence the direction of the lessons. Student-centered practices that achieve this include, but are not limited to, being a facilitator rather than a lecturer, focusing on what students want to know, and encouraging students to brainstorm their own ideas on the topic. Read on for more detail about using student-centered practices to enhance online teaching.

This chapter will discuss...

- How to make an online course more student-centered.
- How to quickly convert from a face-to-face course to an online course.
- Preventing yourself from throwing all of your efforts into creating your online course.
- Creating online experiences that students will enjoy.

Online learning environments can be challenging for teachers who wish to promote student-centered teaching practices. Teachers of online courses cannot always observe students to gauge whether their students are responding well to the lesson. Online courses can be tricky for those teachers who wish to encourage student-teacher and peer-peer interactions. They can pose challenges for teachers who want to promote

motivation to learn through activities, course content, and assessment (Briggs, 2015). Teachers wish to see students engaged, but the inherent physical separation of students and instructors that exists in online coursework can pose unique challenges for the use of student-centered teaching (Briggs, 2015). However, there are many ways that student-centered teaching practices can enhance the online classroom. With the employment of student-centered teaching practices, online courses can seem less mechanical for learners. Student-centered learning practices create a class atmosphere of interaction, focusing on learner needs, interests, and inquiries (ED, 2010). Using student-centered learning practices in online teaching helps students to become active participants in their learning through activities such as partnering in the development of course content, interacting with peers electronically, and making decisions on how learning will occur. Student-centered learning also avoids the use of rote memorization in teaching concepts and favors the encouragement of critical thinking in students (Schunk, 2012).

Beginning to Go Online: Planning Your Online Course

It is beneficial to plan the syllabus, the objectives, and the assignments to have a solid map to follow. Learning objectives are statements of what your students should be able to do after receiving your instruction (University of Colorado, 2007). The material you present should relate to your lesson's objectives. This helps to focus the lesson and guide the students' efforts as they work through the material. Therefore, identifying the objectives you will have for the class and for each lesson allows you to organize your lessons for teaching online more rapidly. Remember that lessons, and their objectives, do not need to be intricately written to be effective, and bullet points can help you to outline your lessons quickly.

Syllabus Development

- Use the syllabus to clearly state the platform(s) you plan to use, and inform students of any additional technology or materials they should have.
- Consider providing a how-to guide for students not familiar with the technology you use for the course.
- If you use a synchronous web-based platform that requires clicking on a common link, consider including that link in the syllabus.
- When posting the syllabus online, clearly title the file so students can identify it.
- Use the syllabus to include information about activities in which students will interact in the online setting.
- Include information about campus resources on information technology services, and accessibility services.
- Use the syllabus to encourage students to contact you immediately if they encounter, or expect to encounter, challenges with access to course.

When planning your course, you should also be aware that each class is different in practice, and you may not end up sticking to your plans precisely. In my teaching, I have found that while it is not typical for a class to stick *precisely* to my lesson plan, I can get them to work toward learning goals each week. Within the planned objectives, being flexible provides space for students to voice interest in a different direction than the lesson plan may lead. Keeping the class centered on the students helps them feel that they have a stake in the lesson, allowing them to bring their ideas to the table, and

ultimately increases their engagement (McCarthy, 2015). Therefore, planning for flexibility in the course's flow, *within* your objectives, is a good start towards setting up your online class to be firmly focused on your students.

How to Speedily Convert a Face-to-Face Course to an Online Format

Before we launch into student-centered online learning, we first need to discuss how to set up an effective online course. So you want to convert a class to an online format quickly, but you are not sure where to start? First, think about whether you would like your class's sessions to be synchronous or asynchronous.

In a synchronous course, you and your students will meet at the same time (Cohn & Seltzer, 2020). An example is using a synchronous web-based platform to communicate with students at regular intervals. For an asynchronous course, you prepare your lessons in advance for the students to access at a later time (Cohn & Seltzer, 2020). An example of asynchronous course design is posting lessons and course materials for students to access via a course management system.

There are advantages and disadvantages to each approach. Synchronous teaching can facilitate responsive communication and allows immediate personal engagement with students (Cohn & Seltzer, 2020). However, it may be challenging to schedule with everyone, and it has the potential for access or technical difficulties that impede its use for you or your students (Cohn & Seltzer, 2020; Flaherty, 2020). Asynchronous instruction is more flexible, self-paced, and allows you to retain your posted past lessons, but could reduce student engagement or understanding of your instruction (Cohn & Seltzer, 2020; Flaherty, 2020). I discuss options for handling the negatives associated with these approaches later in the chapter. For now, let's continue brainstorming how to quickly and effectively set up your online class.

Increasing Accessibility

Sometimes students have challenges accessing course materials. Some ways that you can make your class more accessible for your students include creating transcripts of any videos you use in your teaching (Flaherty, 2020), including descriptions of any videos you use, and using captioning software to assist with student comprehension of your videos. You may also consider having assignments open long enough to capture all time zones, so all students may participate at a reasonable time. Additionally, crowdsourcing the class notes can help increase accessibility. Encourage student volunteers to post their class notes to a common location so everyone in the class can view them. Alternatively, create an assignment for a group of students to post the notes each week.

The next consideration is how you prefer to present your material. Potential options include pre-recording your lessons, maintaining a live class via a web-based platform, or using a format with no video of your teaching, but including resources plus an online discussion (Cohn & Seltzer, 2020). You could also customize your course's presentation by combining the aspects you prefer from each of these options. Each option has its advantages and disadvantages.

If you are used to lecturing, pre-recorded lectures have the advantage of allowing you to teach as you usually would. However, students may find watching a pre-recorded video of you dull, so be sure to let your personality come through as you teach and avoid coming across as scripted. Keep your videos short (Myers, 2014)! A 5- to 7-minute video is sufficient, and if you have a longer lecture, it is good to break it into smaller pieces. Smaller videos are easier for you to upload and easier for students to watch (Myers, 2014). Search your lessons for where they naturally break into smaller units suitable for presentation in short videos (Myers, 2014). When you are recording yourself, speak like students are listening! If students are taking notes from your lectures, speak slowly enough that students can write without pausing the video. While students have the option of backing up the video, if they missed something, they will not be happy about having to do that, so it is best to speak at a pace at which students can easily follow.

To quickly use a pre-recorded lecture format for teaching online, try an approach that uses a lecture video, a quiz, and a live discussion (Johnson, 2020). First, create your module in your course management system. Then,

create a video of your lecture (Johnson, 2020). You can create a video of your slides, where you provide narration (Johnson, 2020); or a video where students see you, or that feature some props or materials you are using to teach that day. A low-point-value online quiz posted on your course management system can serve as a way to check student understanding (Johnson, 2020). Finally, if you wish, you can engage students in a virtual class discussion using a course management system, where you and your students are all online at once (Johnson, 2020). Alternatively, you can have several such meetings to accommodate small group discussions.

To quickly create an online course using a live discussion format, you can use a read, journal, discussion approach (Johnson, 2020). First, create your module in a course management system, making its title easy for students to identify (Johnson, 2020). Then, upload any reading material, videos, or links you wish to include in your module (Johnson, 2020). Let students reflect on the content through a reflection assignment (Johnson, 2020) or a discussion online in the course management system. Finally, send students a link for your virtual class meeting via a synchronous web-based platform, and have students discuss the material they read (Johnson, 2020).

Keeping the live-class feel to your course by regularly meeting using a web-based synchronous platform offers the ability to change gears and immediately address a student's question. The lesson's interactivity benefits the participants as the lesson flows in the direction of student interest, making space for student-centered learning to occur (McCarthy, 2015). However, connectivity issues can be problematic for you or the students, so you should have a secondary plan to use the chat feature or different software if connectivity is a little spotty. To preserve student privacy, consider giving your students the option of not turning on their video cameras and only participating through audio or chat.

A way to teach without posting a video of your teaching is to post links, annotated slides (Cohn & Seltzer, 2020), articles, or publicly available videos (Myers, 2014) for students to review and discuss. The flexibility inherent in using a diversity of posted materials is especially helpful when teaching students with varying interests. If you use a discussion, it is useful to guide students on length, content, and classroom standards for interaction with others. You can support standards rules for discussions by addressing them on the syllabus, sending a class announcement, participating in the debate yourself, or posting your guidelines for conversations along with the assignment. You may find it beneficial to share a discussion rubric along with

your discussion assignment so that expectations are clear. You can adapt the read, journal, discussion format (Johnson, 2020) to teaching without posting any videos of yourself by making the class discussion online-only, such as in a discussion board of your course management system.

Student-Centered Practices for Engaging Students from the Start

At the beginning of your online class, your students may not know each other. Some may be friends taking the course together, but others may not know who else is in the class. An excellent way to begin the semester is to have students introduce themselves, even if it is through an online discussion board. For a large class, it may be helpful to break students into smaller groups, such as online discussion board groups or breakout rooms, and have introductions within the group. The introductions show who is in the class, and many students will share details about *why* they are in the class. From a teaching perspective, this information is absolute gold because it helps in understanding how learning can be adapted to meet the students' needs in the class. The student's active role in the construction of knowledge within the classroom's social environment is a characteristic of student-centered learning (Peters, 2009).

Another exercise that I find very useful was taught to me by the head of Virginia Tech's Graduate Teaching Scholars Program. This exercise involves participatory planning (Sullivan, 1996), with students sharing what they would most like to learn in the class. Similar to the introductions, student comments give insight into their reasons for taking the course, while providing the educator with direct statements about the students' top interests. Participatory planning is excellent for helping me adapt my lessons to teach to the specific content that most interests the class, enabling learner input to drive the direction of the course (Peters, 2009). At the beginning of the semester, I ask students to provide this information, and I make a note of those interests so I am aware of what they want to know.

Tips for Student-Centered Beginnings

- Ask your students what THEY want to know—let them help decide course content (Schunk, 2012).
- Give students choices about how they would prefer class to be administered (Peters, 2009).
- Use think-pair-share activities. Yes, you can do this online! Encourage interaction among students in small online groups and share them with the rest of the class.
- Be a facilitator, not a lecturer. Facilitate open-ended, inquiry-based discussions (Peters, 2009).
- Encourage students to offer up their ideas and new ways of approaching a topic (Brown, 2008).
- Encourage critical thinking over memorization.

Adapting Your Teaching to Work Well Online

Perhaps you feel uneasy about adapting your teaching to the online environment. This feeling may be especially true if you are used to face-to-face lecturing and observing the understanding on the faces of your students as you speak. You may have to make some changes to the way you typically teach, but these changes do not have to be significant. Interaction between teachers and students can occur through online discussions, email, teacher-student messages/chats (Bennett & Lockyer, 2004), and synchronous web-based platform meetings. Use the information presented above to guide you in choosing the best options for your online teaching. Even if you make a mistake, keeping a positive attitude will help you be a successful online teacher. Confidence, adaptability, and positivity are characteristics identified in online facilitators conducive to supporting student understanding and meaning-making (Salmon, 2000, as cited in Bennett & Lockyer, 2004). So stay positive about your online teaching!

A great way of connecting with students in an online class is by being you. That means that you should not aim for perfectionism, as nobody is perfect, and you will only end up disappointing yourself and your students. Many of

your students are looking up to you and are rooting for you to teach the class well. If it is your first time teaching an online course, you may make some mistakes, but remember that students are surprisingly forgiving when they know you are trying. You do not have to try to get a teaching award on your first try in online teaching. Your attitude will shape the students' experiences in the course. If you have a good, positive attitude, students will notice and they will appreciate that you are yourself even if everything does not go perfectly the first time. When you stay positive, it also helps your students to focus less on content transmission and more on learning (Salmon, 2000, as cited in Bennett & Lockyer, 2004). This positive behavior helps students connect better with you and reduce the psychological distance between students and teachers. It also helps mitigate the potential for the online course to become impersonal. Even online students want to learn from a person, not a robot.

Who Takes Online Courses?

The differences between online teaching and face-to-face teaching also affect *who* you teach. The average student you see in an online class can be different than those who may enroll in your traditional courses. One study shows that compared to other majors, business majors are more likely to take online classes (Mann, 2012). Those in the bench sciences are the least likely to take online courses (Mann, 2012). Students residing out-of-state are more likely to take online classes than in-state students, and freshman are more likely to take online coursework than seniors (Mann, 2012). Such differences in the types of students you see in online classes can affect how you teach the class. In my own experience teaching online, I have noted a higher number of students who are unconventional and have busy schedules, such as people who work full- or part-time. More of my students in my online teaching practice have been student-athletes. Other students took heavy course loads and needed the convenience of not showing up to a regularly scheduled class.

What does a different type of student mean for your instruction? Teaching a mixture of nontraditional students and traditional students means you will need to be flexible. Here are some tips from my online teaching practice:

- Have regular days when assignments are due, so students always expect to turn in something those days.
- Contact any stragglers as soon as you notice that they are falling behind. You are often the only teacher who reaches out to them.
- Message the class at least once a week to keep them on track, reminding them of what is due that week. Students appreciate this reminder.
- Issues with module access, course requirements, or personal challenges the students face are often emailed to me by students within 24 hours of my weekly message to my class. From my experience teaching online, I can say that, but for my reminder message, some students in my online courses would not have remembered to begin their online assignments until it was too late.

Teaching Labs Online

When teaching your lab face-to-face, students have direct access to the lab equipment, so how do you teach a lab online? Advantages to teaching labs online include the obvious: Students cannot easily hurt their peers or you if they are taking the lab virtually. If they get bored, they will not likely start fiddling with the Bunsen burners, or playing with the chemicals, as students in a face-to-face lab might. Disadvantages include the lack of direct access to laboratory equipment (Taft, 2020), so students may not feel that they are getting the first-hand experience of watching laboratory procedures. When possible, and especially if students emulate you as you lead an experiment, build your virtual lab around items that they can find in their homes (Taft, 2020). Avoid using a cookbook approach to your lab, which removes student decision making from the process and is teacher-centered rather than student-centered (Peters, 2010). Be mindful of what is missing in a virtual lab and fill in your teaching gap. Items with scents, such as certain chemicals, molds, and even farm animals, cannot be smelled

virtually. Position your camera so that students can see small items you want them to notice, such as a glass slide. Provide a detailed description of any missing elements, or those less accessible to their senses, due to the virtual format of the lab. It won't just make the lab more real for the students; it will make it more fun.

Student-Centered Learning Online: Building Community

Building community is important to any classroom. However, in an online class, it is especially important to build community. Students taking online classes can feel that the human element of learning is lessened in the online class format. Sometimes, students just crave the experience of talking with others when learning. There are several ways in which you can make the online classroom feel less mechanical and impersonal, and in which you can build classroom community.

Encourage Interaction

There are various ways that you can encourage interaction in your classroom. You can build classroom community, increase student decision making, use group work, and harness online platforms to mimic the back-and-forth dynamic of a face-to-face classroom. Below, I discuss each of these items in more detail.

One way that you can build community is by encouraging students to increase their interactions with each other. Engagement activities can help students connect with one another and feel that the class matters to them (VT TLOS, n.d.). Some ways you might increase student engagement through student-centered activities include using roleplay, simulation, service learning, drama, a simulation, and problem-based learning (Freiberg & Driscoll, 1999). Examples of applying a few of these suggestions include giving students an exercise where they each take on a character surrounding an issue related to your material or having students work to solve a real-

world problem (Freiberg & Driscoll, 1999). In online discussions, you may consider assigning your students different titles for roles. For example, roles you may give include those of a responder, a summarizer, or someone who introduces additional resources (Cohn & Seltzer, 2020). Each student takes on their role while participating in the discussion. A responder responds to others in the discussion, and the summarizer breaks larger selections or comments down into more easily digestible statements. The person who introduces additional resources finds material that helps support the debate, such as an article about the topic. Having roles helps structure the discussion while providing each student a good opportunity to contribute to its depth.

Give your online students choices and provide room for them to assist with class decision-making to help make your class more student centered (Brown, 2008). The opportunity to make decisions translates into making the course feel less electronic and more people centered. Many instructors use online discussions as assignments. When I use online discussions to get my students engaged, I provide several prompts for students and allow each student to choose which prompt(s) they wish to discuss. Letting the student choose their prompt will translate into each one engaging in the discussion they are the most interested in, leading to a richer conversation. Permitting students to choose their prompt adds enthusiasm to the class, and seeing who chooses which prompt makes the course more interesting for everyone.

Using group work in your online teaching can help increase student interaction (VT TLOS, 2020). It is important when considering the use of group work to keep in mind those aspects of group work that drive students crazy. Many students can relate to the experience of being the only one in the group willing to do the work for the group project. Others may have had the anxiety-laden experience working with a group that does not begin the assignment until the night before it needs to be submitted. Other times, students in the group simply do not get along. Online classes have the potential to magnify these issues. Communication is not always optimal among students in an online course, and students may conduct all group project communications via email. Because students may not ever see each other's faces in an online class, it can be easier for them to depersonalize communications with their fellow group members. Having students interact will promote connectivity among students and raise student perceptions of

the course as a whole (VT TLOS, 2020). You can do this by placing students in small discussion groups online, which helps them connect as a small group while not feeling overwhelmed by comments of the whole class.

Dividing students into small groups helps them have and enjoy deeper discussions than if the whole class engages in a debate. Research demonstrates that students perceive such groups as better for developing their critical thinking than a larger class discussion (Hamann, Pollock, & Wilson, 2012). Although small groups are beneficial, even whole-class discussions can be helpful to students, because they assist students in more clearly understanding concepts (Hamann et al., 2012). An issue with teaching online while using discussions is that they can lack the back-and-forth of an in-person conversation (Hamann et al., 2012). Therefore, it is important to be creative in getting students to interact. A way that I, and other colleagues, do this is to ask students to post their initial response to the discussion prompt early in the week's lesson. Reactions to others are due later in the week, and students are encouraged to discuss more than what is "required." Setting up online discussions in this way helps students to present their ideas, and then answer the points of others, using the online discussion board, while mimicking the back-and-forth dynamic of a face-to-face conversation.

Other ways that you can help your class to develop that same back-and-forth seen in a live discussion include having students participate in a small group chat or discussion using a synchronous web-based platform. I have also seen good results in a class when students record videos of themselves using the course management system's video feature to present their responses to discussion prompts. Give students helpful feedback on those discussions and on any other assignments you give them online. Students are more motivated to learn when they receive personalized outreach (Boretz, 2012).

Tips for Student-Centered Teaching Online

- Ask students questions! (Brown, 2008).
- Make the course personal by creating options for students to apply the coursework to themselves, their goals, or what is going on in their own lives.
- Do not give direct answers. Lead students to solutions (Brown, 2008).

- Use activities like case studies, scenarios, and roleplaying that allow students to explore options, create solutions, and solve problems.
- Think carefully about your online assignments, walking yourself through each task and what it entails. If you feel it might be online busywork, the students probably will too!
- Give students personalized feedback, considering their own interests, goals, or aspirations. Sandwich a bad feedback sentence between two good feedback sentences, so it ends on a positive.

Preventing Cheating

Cheating can be a serious problem in online classes. Watson & Sottile (2010) found that while cheating did not occur at a higher rate in online courses than in face-to-face courses, the online students were more likely to get answers for online exams or quizzes from others. If you post a quiz or exam online, a student can share screenshots with other students or call their friends and tell them the questions. It can be challenging to know if a student is looking up the answers to an online quiz or exam. Some instructors handle this by putting a time limit on the exam, so students do not have spare time, but I do not personally advocate for this option, as it makes students feel that they do not have the time to show you what you know. And why do the assessment if the results cannot help you find out something about what the students have learned? Some educators try to find a “sweet spot” where the exam is tightly timed, but not too tightly. In my experience with timed assessments online, the educator is a poor judge of the appropriate exam length, and most underestimate how long their exams take. If you are considering tinkering with an assessment’s timing, you are probably going down the wrong online assessment road. Read below for some better approaches to avoiding cheating.

Tips for Avoiding Cheating in Your Online Class

- Make clear what constitutes cheating (Feeney, 2017). Define cheating on your syllabus.
- If you have a quiz or exam, ask questions that are reasonable, not obscure. Obscure questions invite cheating.
- Designate all exams as open-book (Barret-Fox, 2020).
- Avoid assessing a speed-reading test. Remember, some students have English as a second language, while some students may have disabilities (which are not always diagnosed before they attend college!).
- Use questions that require students to analyze, explain, evaluate, create, and otherwise demonstrate their mastery of the material (Budhai, 2020). These strategies make their answers personalized.
- Offer low-stakes quizzes, so the likelihood of cheating is decreased (Feeney, 2017).
- Don't have quizzes or exams at all. Have subjective assignments (Watson & Sottile 2010). Have students turn in all assignments as discussion posts and papers, where they are required to *apply* the material they learned.

General Tips for Online Teaching

- Keep the focus on the student, not the technology.
- Remember that not every student will have taken an online course before. Check understanding of platforms or software you will be using.
- Be gentle with students who have internet accessibility issues. Some students are accessing the class on their phones.
- Resist the temptation to post too many resources. It can cause sensory overload when students have to view many links, articles, or videos.
- Be clear in your expectations regarding assignments, due dates, and policies from the start, but be flexible. Online students may be working, be parents, or have other responsibilities.
- Group projects can take longer to put together for online students. Allow more time if needed.

- Communication with students can be more challenging online. Be as clear as you can be.
- Make yourself accessible via online office hours and regular communication.
- Let your personality come through in your communications with students.
- When you provide students written feedback, always send an announcement. Leaving students feedback online is only effective if they visit the page to read it!
- Technology does not always work the way we want it to. Ask students to let you know if they have issues!
- Think about whether your students have proficiency and access to technology, like cameras, and whether privacy issues could affect participation.

Conclusion and Summary

Online teaching does not have to be a challenge for new graduate teaching assistants or professors. This chapter has outlined simple ways to make moving a class online easier and discussed the disadvantages and advantages of the most popular methods in which online courses are presented. It also highlighted important points to consider when setting up an online system to support student-centered teaching. I hope that with the student-centered tips in this chapter, you can confidently create an online course quickly and help keep the class's focus on your students, not the technology.

Reflection Questions

- What methods can you use to make your online class more engaging?
- How can you make your online class less mechanical and more personable?
- How can you improve communications with and among your online students without making the technology the focus?

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5. Technology Makes It Easier

NASIM EBADI AND GHADIR ASADI

Introduction

Imagine that you have a large class full of students whom you might not have a chance to talk with during the semester. You want all of them to be engaged in the class and participate in the class activities. You might also find undergraduate students to be very shy about participating during class time. Students may be especially hesitant to answer your question while you are teaching new material. Or, you wish to grade the assignments faster and give quizzes every other session without spending so much time with paper collection, grading, and grade entry. You might find it a tedious task to reply to students' emails about this week's reading list, midterm date, due dates, and their standing so far in the semester. A well-designed technology-integrated course might be the solution to your problems. Technology integration is a dynamic process of design, implementation, and evaluation.

How to cite this book chapter:

Ebadi, N. and Asadi, G. 2022. Technology Makes It Easier. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

This chapter will discuss...

- The opportunities and challenges related to technology integration.
- How to design, implement, and maintain a successful technology-integrated course.
- Common types of technologies that can be purposefully integrated.

The Motive behind Technology Integration

Technology is the knowledge or science that helps us to solve problems (Webster, 2006). In this regard, technology can be defined in two ways: as any change in the ways of doing things or as the tools we use to do things more quickly and/or efficiently. For instance, some websites facilitate the grading process for instructors. Devices, such as smartphones and laptops, can be used for taking attendance and pop-up quizzes. Thus, in both definitions, technology can be used in the educational environment to facilitate the process, improve productivity, and enhance various measured outcomes.

Most of our students are from generation Z (born between 1996 and 2010); they are “digital natives” and were born in a globally connected world. They are fast decision makers who tend to record instead of taking notes, are more interested in online examinations, and expect a lecture to “come and entertain me” (Cilliers, 2017). Today’s students prefer integrative games, collaborative projects, and challenges over lectures and discussions (Rothman, 2016). Additionally, quality of education has been proved to be

more important than years of education and/or degree (Asadi, 2020). Thus, students need to acquire the essential skill sets required for modern workplaces, such as critical thinking, problem-solving, ability to keep learning, collaboration, and digital skills (Wabisabi Learning, 2020). Integrating technology into the course provides a learning environment for students to develop their skill sets.

Technology integration can be done on various scales, from playing a video in the class to shifting the course structure so that every activity in the class is blended with technology. Blended learning is defined as the instructional approach that combines traditional face-to-face instruction with technology-based instruction (Herold, 2016). In a blended learning environment, students have control over the time, place, and method of work (Maxwell, 2016). One might consider integrating technology into the course only to the extent that it improves the learning environment and matches our content and style. By incorporating technology into the class, one can employ students' experience in the continuous use of technology to save time and build a more suitable framework for the materials and teaching style.

Another important aspect of technology is that one can tailor it to fit the needs. For instance, each Learning Management System (LMS) offers a range of features. The instructor can integrate as many features they want into the course, and in some cases, by combining these features, they can develop new applications. In particular, using LMS, you can deliver the material in different forms, such as sharing videos, audio, documents, and links to further educational sources. In addition, by gathering immediate feedback from students using discussion panels or direct messages through LMS, the instructor can take customized action regarding the subject matter.

Free multiplace multitime accessibility is another advantage of a technology-based learning environment. In many cases, technologies are free, or they have a free version with limited features, and contents are accessible in all places via the internet, at all times, and on multiple devices. For instance, online tutorial videos create opportunities for students to be self-educators and acquire new skills. Moreover, technologies can assist in structuring and managing large classes in many ways, such as monitoring attendance, administering quizzes, grading exams, assessing, summarizing students' opinions, playing games, and last but not least, sharing content. Integrating technology is useful for instructors in several other ways,

including improving communication, collaboration, time management, and in the availability of instructional resources such as Open Educational Resources (OER) and applications.

There are two important benefits of using technology that need to be highlighted: using technology to improve diversity and inclusion, and to design a syllabus that extensively uses technology.

Diversity

One important feature of technology is the ability to introduce different delivery methods specifically designed to address the needs of different audiences—a powerful instrument to enhance diversity and inclusion. In that regard, technology can be of great help in increasing accessibility and providing equal opportunity for all students. For instance, one can caption both the lecture and other multimedia for access by deaf or hard of hearing people. Alternatively, facilitating online submission using voice recognition tools helps blind or partially sighted students more easily submit assignments. Students with anxiety have a hard time taking notes and following the flow of the class. Using online materials, slides, recording the sessions, providing audio files, and encouraging note sharing between students helps students with anxiety stay calm in the class and focus on learning. These strategies can ensure the student has both all the materials and the opportunity to review them later on.

Another benefit of technology is helping students to pass cross-cultural barriers. For instance, students with different cultural backgrounds (e.g., international students) might have difficulty participating in the class activities for various reasons, such as fear of not being understood because of speaking with an accent or a lack of confidence. Using technology in class helps these students by providing an engagement opportunity without pushing their comfort boundaries. Moreover, technology allows you to present the same materials in different formats such as text, pictures and graphs, audio, and video. This enables students with diverse learning styles and attitudes to connect themselves with the teaching materials through a channel that better suits them.

Syllabus Development

A syllabus is an important first opportunity for technology to jump in and benefit both the instructor and the students. A technologically integrated syllabus has many advantages. First, it is easily available to students during the semester, as opposed to the traditional paper distribution format which most students will lose in the second week. Second, it is a source file for all other technology that you are using. For example, if you are using an application for taking quizzes in your classroom, or, if you require students to purchase an integrated account with their textbook to do the assignments, the syllabus is the place to provide instruction and hyperlinks for students to refer to. Third, with most LMS available on the market, you have an option for an online syllabus. Using that option enables you to connect all of your contents with the syllabus and students will be able to walk through the syllabus during the semester. You can link all of your slides, extra readings, external links, assignments, and due dates in one place. You can divide your syllabus into weeks, parts, or chapters, and you can set reminders for students regarding your class progress, such as a notification for assignments' due dates. Finally, a technologically integrated syllabus makes your course transition much easier. You can easily migrate from one semester to another by a few clicks and by making some minor changes in due dates and links.

Technology Integration and Challenges

Integrating technology is a broad concept that can cover many techniques and tools. Having technology as an integral part of the classroom is not a one-time effort to facilitate teaching and engagement. Technology integration is a dynamic process of design, implementation, and evaluation. However, integrating technology into the classroom is a challenging task. Instructors complain that using laptops or smartphones during the lecture increases the possibility of distraction. Moreover, technology does not always work correctly; we have all had this experience at least once in our life. Therefore, being solely dependent on technology is not a good strategy.

Lack of technical support is another critical challenge regarding technology integration. Having proper technical support in terms of both training and maintenance is vital for technology integration. Finally, technology advances quickly, and keeping yourself and students updated is a continuous investment. Some of the technologies introduced in this chapter will likely change or even become obsolete over time. It is the responsibility of instructors to keep themselves current with technological advancements. In this section, each step and its associated challenges has been introduced.

Design

Engagement theory suggests that creating a meaningful learning environment requires three principles: collaborative effort, project-based assignments, and non-academic focus, that is, having an outside-of-the-classroom focus (Kearsley & Shneiderman, 1998). Technology facilitates all of these principles. In particular, technologies such as Google Drive and communication-based applications enable collaboration by easing content sharing and group meetings outside of the classroom. As discussed below under types of technology, most of the technologies support both individual and group communications. These technologies enable instructors to easily track, assess, and improve teamwork among students. Instructors can also help students practice solving real-world problems by using online resources such as free data sets or student-based industry projects.

Depending on the objectives of the instructor, she can use technology at different levels. Sometimes technology only helps to facilitate an old activity like taking a quiz or grading the exams. Instead, the instructor can design a new (in or outside of the class) activity or assignment by focusing on higher critical thinking levels. In particular, as Bloom's technology taxonomy (Sneed, 2016) suggests, asking students to create new content such as by blogging or making a podcast is more valuable for students than merely playing a video during the lecture. This is mainly because creating new content requires high levels of critical thinking that include connecting the ideas and developing new ideas. The instructor can also engage students in the design procedure by asking their opinions on what they want to learn, how they want to learn, and inviting them to share any successful experience with a particular technology.

Implementation

Successful implementation of technology requires addressing several key aspects. The instructor needs to ensure the availability of the technology in use. For instance, in using a new application to facilitate students' collaboration, the first step is to make sure the application is readily available for all students. Moreover, students might need to receive training and technical support from either the instructor or someone else. In particular, if the instructor uses a Windows (Mac) device, it is essential to make sure she knows how to implement the same process on a Mac (Windows) device. Additionally, financial constraint is one of the crucial challenges of successful technology adoption. To overcome financial constraints, it is better to use more OER and free technology.

In addition, it is better to always have a backup strategy in case the technology was not available to use for any reason. For instance, having a pen-and-paper option or downloading online materials beforehand can reduce the instructor's stress. In this regard, another consideration with the use of technology is that anyone can easily be caught up in using technologies up to the point where they forget why they started using it in the first place. For instance, excessive use of virtual communication

applications may cause students to lose real-world communication skills (Al-Bataineh & Brooks, 2003). Thus, the best approach is to treat technology as a tool, not as an end in itself.

Evaluation

Evaluation of technology integration takes two different yet interrelated approaches. First, in a broader sense, one can measure how technology integration affects the achievement of learning objectives. Second, one can evaluate every step of the integration, including design and implementation. Gathering feedback from students and peers regularly is an important part of a successful technology-integration process. Instructors can use multiple sources for feedback, such as direct feedback from students, peer observation, and self-reflection. Feedback can be both visual or verbal. For instance, by using polls, discussion panels, or watching student-created videos, instructors can gather useful feedback from their students.

Types of Technology

One feature of new technologies is their flexibility and the interchangeability between different structures and configurations. Thus, categorizing technologies in the education industry is useful but not accurate. For instance, LMS integrate data from many different platforms with different capabilities, options, and uses. Here, categorization is based on the main instrument intended in the design of the introduced technology. In each case, you will receive a description of the other available types and options as well. Additionally, only the technologies that one might use in a class environment to communicate with students inside or outside of the class or provide materials has been discussed. We deliberately do not discuss other resources available for instructors that have been provided by new technologies like educational multimedia on YouTube and elsewhere, free courses with free textbooks, and other learning materials on [OpenStax](#), [Oasis](#), and [Lumen](#).

Technology has generally been divided into three groups. *Web-based technologies* are those technologies that require you to have access to a personal computer, laptop, or tablet to best use the technology. Although these types of technologies are accessible using a smartphone, to develop and manage the content and communicate with the technology to use it to its full potential, you need to use a personal computer. The second type of technology is *application-based technology*. Although technically web-based technologies include application-based technologies, we define the latter as a technology in which instructors and students only need a smartphone to use the technology to its full potential. Again, in general one can use a personal computer to access these technologies as well, but a smartphone does the job best. Finally, *instrument-based technology* requires instructors and students to use an external device to use the technology. The main difference here is that, despite the first two types of technology, usually there is no need for the internet, and the device is enough for the communication between the instructor and students.

Technologies can be categorized based on other characterizations as well. For example, in an era where higher education is very expensive, it would be advantageous for technology to be free or very cheap for students. Then, the pricing options can differentiate the technologies from each other. One common strategy between the developers of new technologies is to provide pricing options or second-degree price discrimination. By providing a range of services within a predefined bundle, one has a choice to choose the price-service correspondence. Since the pricing options are changing based on the competition in the market and the emergence of new rivals in the ever-innovative and competitive environment of technology, pricing has not been a source of comparison here. The existence of a free version has been mentioned and interested readers can follow the provided links in the list of references and find the current pricing options for each technology at any time.

Another way of categorizing technology is to group them based on their use in the class environment. As it will be explained later, some technologies are designed to develop and manage content, some to collect students' ideas and comments, some for quiz or test administration, and some for communication and collaboration, etc. Although it is a useful categorization, there are a vast number of technologies that do two or more of these functions simultaneously. For instance, most Learning Management Systems potentially can provide all the mentioned services, one way or another. In

other words, a grouping based on the usage cannot partition technologies at all. Here, the different services each technology provides has been discussed, and one can connect the dots for categorizing based on the services each technology offers. Table 1 summarizes the introduced technologies in this chapter.

Table 5.1 Features of technologies described in this chapter.

Technology	Free Version	Paid Version(s)	Multimedia Sharing	Other Content Sharing	MultipleChoice Assessment	Verbal Assessment	OneonOne Communication	Group Communication
Web-Based								
Canvas	✓	✓	✓	✓	✓	✓	✓	✓
Blackboard		✓	✓	✓	✓	✓	✓	✓
Moodle	✓	✓	✓	✓	✓	✓	✓	✓
Google Classroom		✓	✓	✓	✓	✓	✓	✓
Google Components	✓		✓	✓	✓	✓	✓	✓
Polls Everywhere	✓	✓			✓	✓		
Mentimeter	✓	✓			✓	✓		
Padlet		✓	✓	✓				
ExamSoft		✓			✓	✓		
Zoom	✓	✓	✓	✓	✓		✓	✓
Skype	✓	✓	✓	✓			✓	✓
Slack	✓	✓	✓	✓			✓	✓
Join Me		✓	✓	✓			✓	✓

Pear Deck	✓	✓	✓	✓	✓	✓	✓
Loom	✓	✓					✓
Application-Based							
Kahoot	✓			✓			✓
Top Hat	✓	✓	✓	✓	✓	✓	✓
Quizlet	✓						
GroupMe	✓	✓		✓		✓	✓
Band	✓	✓				✓	✓
Flipgrid	✓	✓				✓	✓
Discord	✓	✓				✓	✓
Whatsapp	✓	✓		✓		✓	✓
Telegram	✓	✓		✓		✓	✓
Instrument-Based							
Iclicker	✓	✓				✓	✓

Web-Based Technology

Web-based technology is one of the most flexible technologies and it currently dominates the learning industry. The main advantage of this type of technology is its adaptability and potential to offer new services. Moreover, most web-based technology can host its own application-based technology, making it more user-friendly and accessible. Here, we introduce a few prominent web-based technologies to build a ground for the reader to choose among the list here or find one on the web.

Learning Management System

A Learning Management System (LMS) is an online platform in which firms and/or instructors can manage and organize learning materials for their audiences. LMS consists typically of a predefined setup that enables instructors to create and manage content; create and manage different types of assessments; and monitor, grade, and provide feedback on students' progress. Moreover, an LMS provides an opportunity for collaboration and integration with other learning portals. All universities now have an online LMS for course management. From the authors' experiences, the best practice in using the LMS system is three-fold.

1. Keep your class page neat and straightforward so students can easily find anything they need. You can do this by creating folders, sections, and cross-references.
2. Put all contents online. Students should have access to slides, assignments, extra readings, useful links, data sets, etc., on the LMS.
3. Do not push it too hard. It is tempting to use all the LMS system capabilities, but technology integration has an optimum level. It can quickly get overwhelming for students to learn about different aspects of the technologies. Only use the part of your LMS system that makes you and your students' life more manageable.

In choosing a good LMS, institutions look at the pricing, scalability of the platform with the size of the institution, availability of an intuitive customizable user interface, compatibility with plug-ins offered by external third-party developers, existence of a supportive community, and availability of a high-quality smartphone application. Here are some well-known LMS currently on the market.

[Canvas](#) has a very intuitive and flexible environment with all the desirable features of a standard LMS system that have been mentioned. Moreover, it allows instructors and students to communicate instantly, lets the students peer review each others' assignments, and has a discussion forum for each class. Although it is continuously improving, one can catch up with the new changes through the official website or ask questions on the Canvas Community. The Canvas smartphone applications, which help instructors, students, and even parents to have easy access to the provided materials in the original platform, increase the accessibility of Canvas.

[Blackboard](#) allows you to share files with your students, contact them, and monitor their progress. It has many other features that are expanding over time. Similar to Canvas, one can get introduced to the platform, catch up with new features, and/or resolve issues by using the website to connect with the Blackboard Community. Blackboard also has smartphone applications.

[Moodle](#) is also getting instructors' attention. It is easily adapted to different teaching styles, contents, and fields. It has quite a few applications for easy access on smartphones, and more importantly, its free version provides a lot of options. Moodle is open-source and has a viable community as well.

Google has developed its own LMS called [Google Classroom](#). Although Google Classroom is in its early years, it has great potential considering its integration with Gmail, Google Drive, Form, Sheet, Docs, Slides, Meet, and Groups. It is only free for schools already using Google Apps, but due to the cost, it is not hard for an individual instructor to buy.

Google Components

Using Google Classroom is not free, but other Google products and applications can be beneficial, and they are free of charge. Here are a few tips on how to use Google products in a classroom setup. Use Google Drive to share a folder or a file with your class. Use Forms to create a simple public or anonymous response or polls from your student and run a quiz in your class or collect your students' comments and suggestions. Use Google Sheets, Docs, and Slides to share content with your students. Finally, you can use Google Groups to create a group for your class and use it as a tool to quickly access your students through email, for example.

Tools for Assessment and Engagement

Many students are shy about expressing their ideas in the classroom, especially for new content. Students are often hesitant to suggest what seems an “off the wall” idea or are afraid they might choose the wrong answer, both of which could end up embarrassing them in front of their classmates. Technology can help students engage with the material without forcing them to move away from their comfort zone. Using the assessment and engagement tools, students can make comments, evaluate their learning progress, and participate in quizzes without feeling judged or embarrassed.

One handy technology in this category is the [Poll Everywhere](#) platform. With this platform, which like the other one, has a smartphone application, you can run polls in the class with a variety of choice types. Moreover, you can instantly get results and analyze them using graphs, charts, and other available options. It is only free for very small classes (currently the limit is 25 students), but there is a continuum of pricing options. Other websites help you to create content as well as administer quizzes. [Mentimeter](#) and [Padlet](#) have predesigned tests and content that make the instructors' life easier. [ExamSoft](#) provides a platform that enables the instructor to administer tests easily. More importantly, it provides a detailed assessment tool instructors can use to evaluate learning progress, quality of the exam questions (it can

even evaluate the quality of the curriculum). The same services exist for students to follow their progress and find the concepts that need more attention.

Video Conferencing Tools

We are writing this book in a time when COVID-19 forced us to stay at home. Halfway through the spring 2020 semester, almost all universities canceled all physical in-person classrooms and moved online. One technology that enabled them to do so was video conferencing. With these technologies, you can experience a virtual classroom, present from your slides, use a blackboard, and talk with your students. Most of these technologies require personal computers, with smartphone applications that can support the essential functions. [Zoom](#), [Skype](#), [Slack](#), and [Join Me](#) are among the most used applications for these purposes.

Add-on

There are plenty of add-ons that can be combined with Google and Microsoft products to help you conduct quizzes or collect students' responses to quizzes. For example, [Pear Deck](#) can be added to Google Slides or Microsoft PowerPoint and by creating quizzes, adding videos and multimedia, and sharing notes with the students, engage the student within the class, or students in remote or online sessions with the materials. Other add-ons (e.g., [Loom](#)) are available for your browser or as a separate software that enables you to send videos to your students and colleagues.

Application-Based Technology

Application-based technologies are those technologies that are best or most delivered by smartphone applications. Students tend to be easily distracted in the classroom environment, and instructors can keep them engaged with a variety of both content and its presentation. Improvement in communication technology has motivated many people to buy a smartphone, and no matter how much you oppose the use of smartphones in the class environment, you cannot deny they have made a wide variety of learning content and procedures available for free or nearly free. As we mentioned before, you can almost always use personal computers or tablets to access the same services as well.

Assessment and Engagement

Some application-based technologies can be used for assessment, playing games, and sharing learning content—for example, if you need to play a game with students, to conduct a short quiz every session, or to assign a challenging in-class assignment that keeps students engaged in the classroom. Ask your students to download [Kahoot!](#) on their phone and you can create multiple types of quizzes for class or assign a project for home. You have the option to use the predesigned games, a question bank, duplicate your existing course, add media contents to your course, and many other cool features. Kahoot!'s reporting on and analysis of students' performance, as well as a student's ability to collaborate with other Kahoot! users, combined with a very good content management system, give Kahoot! an advantage over other application-based technology.

[Top Hat](#) is another application that instructors can use to design and assign exams and quiz and create homework for the class. It could also be integrated with the LMS systems to provide assessment feedback on students' performance for the instructors which help the teacher to make the necessary actions based on that. [Acadly](#), [Turning Technologies](#), [Echo360](#), [Qwizdom](#), [Ombea](#), [Class Question](#), [Socrative](#), and [Arsnova](#) provide alternatives to Top Hat for use in taking online attendance and administering quizzes.

[Quizlet](#) helps students and instructors to summarize the course for improving the learning process and easier review. Moreover, students can contribute to creating class content. Although this method's effectiveness depends on the contents and student-specific learning characteristics, more and more content is being developed for these types of technology. [Brainscape](#), [Course Hero](#), [StudyStack](#), and [Flashcard Machine](#) are among Quizlet's rivals on the market.

Communication

Other applications are designed to facilitate communication, group activity, and sharing of content. For example, you can create a [GroupMe](#) for your class, and students can share notes with each other or ask simple questions regarding class materials or due dates. GroupMe only needs a phone number from each member, and like any other applications, you are instantly in touch with all of your students. As the system works like a group chat, not necessarily relying on the internet, it is a very easy and efficient method for your students to find peers and create a study group. Moreover, some of its features do not require continuous access to the internet either. For texting, you do not even need a smartphone. Thus, with a bare minimum of a phone, you have access to all of your students, and they have a continuous connection with each other. As a caution to readers, we encourage you to review your campus' policies regarding software access to student information. Your campus may have restrictions on the use of this type of technology.

The [Band](#) application is another useful application for connecting a group of people for collaboration and content sharing. Band has the feature of highlighting important messages by showing them at the top of the board, notifying members of important messages or a specific date, monitoring the readers (or as they phrase it, "keeping members accountable,") and many other features.

Some applications are designed to create content in multimedia format in the educational environment. [Flipgrid](#), for example, was designed by Microsoft to create videos. There are quite a few other applications that can be used for communication in text, voice, and video, sharing content

in different formats, and direct calls between members, including [Discord](#), [Whatsapp](#), and [Telegram](#), and one can find a dozen more on the internet as well.

Instrument-Based Technology

With all these smartphone applications, it seems an old idea to ask students to buy an extra device for class communication. However, instrument-based technologies are still in use, and universities support instructors in using these devices. One advantage of these instruments is your confidence in their accuracy when using them as a tool to monitor class participation.

Iclicker

Instructors usually use [Iclicker](#) to monitor class participation or conduct multiple-choice quizzes in the class. The new version of Iclicker has a keypad, and students can submit verbal answers as well. Moreover, instructors can give students the option to use smartphone applications, which makes the technology cheaper.

Summary

This chapter explains the opportunities and challenges related to technology integration in the classroom. Modern classrooms where the instructor and the students utilize new technologies are crucial. The most important benefits of integrating technology into the classroom include developing digital skills; improving learning content; incorporating various educational sources; increasing engagement, accessibility, and inclusion; and overcoming cultural barriers. However, there are many challenges, such as creating opportunities for distraction, lack of technical support, and drastic technological advancement. Successful technology integration requires a

dynamic process that mainly focuses on instruction objectives. We have introduced and described many technologies that can help instructors adapt to the new technology-integrated teaching environment; these are summarized in Table 5.1. In the end, each instructor needs to answer a few questions to determine how to use the knowledge she gathered from this chapter.

Reflection Questions

- How can technology help you to achieve your goals?
- What kinds of technology do you want to use?
- What is the appropriate level of technology integration for your class?
- How you want to assess your technology integration at the end of the semester to fine tune your strategies in the future?
- Answering these questions and others that can be added depending on the specific context, enable the instructor to use the technology to its fullest capability.

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VIGNETTE: No really, I don't have internet

BETHANY WOLTERS

In 2007 and 2008, Bethany was a high school senior trying to take an online dual enrollment course from a local college. While most people were getting high speed DSL internet, in the part of the county where Bethany's family lived the only option was slow dialup internet even though they lived only an hour away from a major southeastern U.S. city. To watch the 3-4 hours of recorded lecture videos per week, Bethany drove to either the local library or a friend's house—or waited at least 30 minutes for the video to buffer on her family's slow internet. She had to wait until everyone else had gone to bed to try and watch the video lectures at home because at that time no one else was trying to use the phone or internet (and you cannot receive or make phone calls when using dial-up internet). On Tuesday nights, Bethany drove to a friend's house across town for an hour to participate in the synchronous instant messenger chat discussions. Even though it was completely text-based, the internet at her house was not fast enough for her to keep up the conversation. If it was not for the generosity of her friends, she would have needed to drop the course.

It wasn't until Bethany moved to college in the fall of 2008 that she realized how much access to fast, reliable internet made college easier. She created her first social media account because now it wouldn't take 30 minutes for a picture to upload or 10 minutes for a page filled with pictures to load. Thanks to an initiative in her home county, her parents got high speed internet later

How to cite this vignette:

Wolters, B. 2022. No really, I don't have internet. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

that year. She was so thankful because it meant she didn't have to decide between visiting family for the weekend or getting her homework finished for class.

Bethany assumed that she wouldn't have to worry about internet access in the future. But ten years later she moved to the Eastern Shore of Virginia to do field work for her PhD at Virginia Tech. The Eastern Shore is an hour by car from Norfolk and Virginia Beach (closer by boat) and just a few hours away from Washington, D.C., but it is located on a peninsula between the Chesapeake Bay and the Atlantic Ocean. Being rural and somewhat isolated, neither high-speed or dial-up internet was not available where she lived on the Eastern Shore. Her only access, as for most of the people in the area, was on a smartphone. Even smartphone access was still limited, because she couldn't afford an unlimited data plan on a graduate student salary. Other people used mobile hotspots for their internet access but paid several hundred dollars per month and sometimes had trouble connecting during bad weather.

Fortunately, Bethany had internet access at work and other people in the community usually had internet access at school, work, or McDonalds. Bethany and other graduate students on the Eastern Shore had to stay at work late to get their online courses finished or download and print off any work they wanted to do at home. Bethany continued to take some online courses, despite the challenges, because it allowed her to participate in spring and fall research while still completing her classes. One of her classmates worked full time on the Eastern Shore and was working toward a graduate degree from the same university, seven hours away. But Bethany wished that her professors and the students she worked with on group projects understood what it was like to not have internet access after work hours. Some people didn't believe her that internet access was still a problem in 2016.

Bethany got a job in fall 2019 as an agriculture professor in western Tennessee and didn't think much more about the problem of internet access until March 2020, when all of her students went home and the entire university pivoted to completely online learning. The day before students left campus, she asked them about their internet access at home. Out of sixty students, 6 students could not stream live videos, 16 students said it took a long time to upload or download large files (any lecture videos) and 11 said they had to leave home to access the internet. All students knew of a place they could go to access the internet, like a local library or school, but it might

be a 30- to 60-minute drive from home and soon these locations closed due to pandemic lockdowns. For some students, cell phones were their best access to the internet but not all the Learning Management System (LMS) functions, like quizzes or exams, worked on mobile devices. There were a few students who requested to stay on campus during the lockdowns because they wouldn't be able to finish their online classes from home.

Bethany considered going to her parents' house during parts of the pandemic, but she knew that internet access would be inadequate to teach online. Upgraded high-speed broadband internet had not reached the rural portion of the county where Bethany's parents lived. They had the same internet speeds they got in 2008 but the rest of the internet had moved on and was moving faster. A lecture video that would take 1-2 minutes to upload at work wouldn't even upload from her parents' house.

This was really frustrating to Bethany. The experience her students were having was exactly the same one that she had with her first online classes more than a decade ago. Why were the same problems happening? The fact is that rural and certain urban areas have been left behind in their ability to access the internet.

Fortunately, Bethany had learned a thing or two about how to navigate online classes with limited internet access. She encouraged students to use the mobile versions of the LMS and other online content that worked well in apps. For example, YouTube videos are much easier to watch on a phone than videos uploaded to an LMS. However, she let her students know that they needed to plan ahead because it was going to be very hard to take quizzes using the mobile LMS app. She made all of her lecture videos downloadable and provided a downloadable, printable Word document with all of the text from pages within her LMS. Bethany intentionally set the assignment deadlines during the day on a weekday, when locations that provided free internet would be open. She let students know that she was willing to adjust the due dates on assignments or online exams if they knew they wouldn't have internet access on certain days and several students used this accommodation. Bethany was really excited about using Flipgrid, a video-based discussion app, with one of her classes but soon discovered that some students didn't have enough internet bandwidth to use the app. So, she had to create an asynchronous discussion board assignment for students who couldn't use the app.

Online classes continued in fall 2020 and spring 2021. Most students were adjusting well to online classes but she still came across a few unexpected situations. Bethany was talking with Henry, a student in one of her classes, and learned that Henry's grandfather had a heart attack at the start of the semester and while he was recovering, could not take care of the family farm. Henry and his high school aged sister were splitting the farm work their grandfather used to do. Henry took care of the farm Wednesday night through Sunday morning and then returned to campus Sunday night through Wednesday morning. At first, he was not able to access the internet at home but then was able to get a free hotspot from the university for the semester. At the end of the semester Henry told Bethany he would not have been able to finish the semester without that free hotspot. Other issues occurred when a major snow and ice storm hit the southeast and the university stayed open because most people were teaching online anyway. But students who lost power, internet, or water during the storm had a really hard time keeping up with their course work. In some cases, students could not even let their professors know they were without internet or power until almost a week later. Even in an area with high-speed broadband access, some students might not have internet access because they could not afford to pay for it.

So, what can you do to support students who might have limited internet access?

1. Ask students at the beginning of the semester about their internet access at home, around campus, during the week, on weekends, and over breaks.
2. Think about how you can make most or all of your course material available in an offline format.
3. Upload or share lower resolution versions of files for faster upload and download times.
4. Test out the functions available in app versions of your LMS and other teaching technologies.
5. Test or ask students to test apps or programs in a slow or limited internet area.
6. Be intentional about assignment due dates and times and let students know if due dates can be adjusted.
7. Advocate for greater internet access for your students and the communities where they live.

6. Fun Fridays: Incorporating Hands-on Learning into Lecture Courses

BETHANY WOLTERS

Introduction

If you observe a traditional lecture class, it will be the teacher who is most physically and mentally active and engaged, not the students. In a class with hands-on learning, you will see students being involved in their own education by debating a case study in small groups or using a reference manual to solve a problem. Hands-on learning happens when the action that takes place in the classroom is done by the students rather than the teacher. Hands-on learning does not require physical movement, but it requires an active mind, similar to how a chess player will plan the next few moves in their head before reaching out to move their piece (Barkley, 2020). Laboratory, field, and studio classes use hands-on learning to teach concepts and develop skills, but hands-on learning can also be used in lecture courses.

Hands-on learning in lecture classes can reinforce student learning and enhance the understanding of course content, and is often more interesting than lectures. The benefits of hands-on learning activities in class are greater student motivation to learn, a sense of community in the classroom, (often) higher grades, more student confidence while learning new things,

How to cite this book chapter:

Wolters, B. 2022. Fun Fridays: Incorporating Hands-on Learning into Lecture Courses. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

and development of teamwork and soft skills that they would not practice in a lecture (Deslauriers et al., 2019; Svincki & Mckeachie, 2014). Having students perform a task, practice a skill, or solve a problem prevents the “illusion of understanding” that can happen when listening passively to lectures and taking notes (Svincki & Mckeachie, 2014). As more universities choose to remove lab sections from applied science courses due to a lack of funding, space, and personnel, hands-on learning can provide the essential skills to help students prepare for future careers.

This chapter about hands-on learning was written with knowledge gained through the first-hand experience teaching with hands-on learning. Hands-on learning was used in an upper-level Soil Fertility class every Friday, during “Fun Fridays.” The only rule for Fun Fridays was no lecture. Instead, the class members explored soil fertility concepts and skills through workshops, case studies, discussions, and other activities in a traditional college classroom with rows of desks, blackboards, and a projector. The stories and lessons from the Fun Friday classes in Soil Fertility course will help you prepare for hands-on learning before the semester starts, facilitate effective hands-on lessons and highlight potential challenges with hands-on learning.

This chapter will discuss...

- The benefits of using hands-on learning in traditionally lecture-based courses.
- How to prepare, develop, facilitate and assess hands-on learning.
- The potential challenges of using hands-on learning in the classroom and how to meet those challenges.

Preparing for Hands-On Teaching

Preparation is even more critical for hands-on learning than it is for lecture-based learning because once you give it to students, you're mostly out of the picture. A little thought and preparation will go a long way toward making both the hands-on activities and your overall class successful and help students learn. You can prepare by identifying elements to teach through hands-on learning, creating lesson plans and considering incorporating active-learning overall course structure.

Finding hands-on learning topics

Students learn skills best through hands-on practice. Hands-on learning can also teach students about concepts and theories by showing rather than telling. It is all right if you are not sure exactly how you will use hands-on learning to teach these topics because as you start developing lesson plans and preparing for class, ideas and inspiration are likely to come to you.

Lecture-based classes tend to focus on “knowing” content. To guide your development of hands-on learning, instead of asking yourself, “What do my students need to know?,” ask these questions about your course content:

- What do I want my students to be able to do?
- What information or tools do I think my students need to be able to find or use?
- What products or performances do students need to be able to create and present?
- What decisions do my students need to be able to make?
- Are there any scenarios, simulations, or experiments that demonstrate the principles students need to know?
- What are the issues or discussions in this field that my students need to be aware of?
- What lessons from the history of my field can my students and I learn from this story?

The answer to the first four questions will be specific tasks or activities that will likely be both the learning objective and that lesson's activity. The last three questions can help you develop hands-on learning for topics that do not have immediate applications. The hands-on element comes when students must form their arguments, opinions or reach their own decisions about simulated or real situations. Story-telling elements of case studies or historical events can also make learning more engaging. For example, in Soil Fertility, students learned about urban soil contamination sources and how organic matter can be used to remediate soils through a case study about an urban community garden in a food desert (Harms et al., 2014). Combining the answers to these questions with learning objectives will give you the overall plan for your hands-on learning lesson.

Placing hands-on learning within your course

The second most important decision is how and when hands-on learning will happen in your course. This decision needs to be made early in the course design process because it impacts scheduling, assignments, grading, and course policies. You should carefully consider details like how much time there is for activities in each class period, the arrangement of chairs and tables in the room, and the number and size of student groups.

Hands-on activity lesson planning needs to happen with the overall course lesson plan in mind. Will you use hands-on learning in every class period or once or twice a week? Will there be in-class lectures or a flipped classroom, with lectures or readings outside of class? In Soil Fertility, hands-on learning happened once a week, on Fridays. When you consider the placement of the activity within the semester, ensure sufficient scaffolding around hands-on learning activities. Hands-on learning activities can reintroduce and reinforce content from lectures and assigned readings earlier in the week or can be used to introduce a concept in preparation for readings and lectures. In some situations, the hands-on learning activity may stand alone without any additional instruction, but this is rare and is not appropriate for the most crucial course concepts.

How much time things will take and how much content to cover is hard to answer if you have never taught the material in a hands-on learning lesson. A general rule you can use is to assume an activity will take twice as long

as you expect it to take. After you have taught an exercise once, you will be better able to gauge how much time it will take in the future. Until then, have a general plan for how you might shorten the activity or lesson by a few minutes if it is running long. You could plan an alternative ending activity, reduce the closing debrief section, or allow students to finish the remaining work at home and submit it in an alternative manner. Another option is to complete the activity in the next class period or provide a video, hand-out, or reading that allows students to learn the remaining content at home. You should also plan to have extra activities or content if the activity goes faster than expected or for students who finish more quickly than their classmates. Prepare about 25% additional content or activities that you don't think you will realistically finish. The supplementary material is useful for extra practice problems or future assessments if you don't use it in class. Individual self-paced activities, as opposed to group assignments, are more time flexible. Students who finish quickly can leave, but students who take more time or need more help can continue working without pressure to keep up.

The way hands-on learning will be graded and how it contributes to the final course grade will influence how well it works. It might seem that grading hands-on learning will detract from the value of learning in hands-on lessons, but it helps students buy into the experience. Emphasize the importance you place on hands-on learning in a context that the students will understand: grades. Imagine that your students are your employees, and you pay them in points toward their final grades in exchange for class activities and assignments. They will prioritize what you value, and grades communicate to students what you view as valuable. When calculating the total grade proportion from hands-on learning, consider the amount of in-person class time you will spend on hands-on learning, both in-class and out of class, and the amount of time needed for other class activities. Making hands-on learning worth as much or more than more traditional assessments communicates to students that you want this to be important in this class. Hands-on learning activities can be graded based on participation or correctness, or some combination. When hands-on learning is graded based on attendance and participation in hands-on activities, there are no grades attached to the quality or accuracy of students' products or work. Grading for participation and engagement, rather than correctness, lowers the stakes for students uncertain about hands-on learning, allows you to give them more challenging activities, and often does not require as much effort

to grade. It also lowers the stakes and provides more flexibility to you, as the teacher, if new hands-on lessons do not go as intended or expected. But you will need to use other assessments to assess their knowledge and skills. The other option is to grade the accuracy and quality of products created by students during hands-on learning. If you do this, you need to provide sufficient time, resources, and instruction for students to feel like they can be successful. Either follow the same grading criteria every week or clearly communicate your expectations at the start of each activity.

Finally, think about the logistics of how hands-on learning will work in your specific classroom. Evaluate and decide how to use group work; use the chairs, table, and space within the physical classroom; and what other resources you will need. Hands-on learning can be done individually, in small groups, or in some situations as an entire class. Groups can be self-selected or assigned, permanent or flexible, and each has pros and cons. It is easy to switch between individual and group work throughout the semester, but it is easier to form groups, in the same way, all semester long. The physical arrangement of your room has a significant impact on the amount of active learning that can happen. But don't let traditional lecture room set-ups stop you from using active learning in your class. If possible, move the furniture or allow students to spread out throughout the entire space (sitting on the floor or auditorium stage, or in the aisles). You can also utilize virtual spaces to collaborate when a physical setting does not easily allow it. What technology and tools will you use in hands-on learning? Students can work on physical paper hand-outs and refer to reference books, or they could be collaboratively working on a class document and referring to web resources. Students need to know at the beginning of the semester and before each hands-on learning class, what technology they will need to bring to participate.

Diversity

Hands-on learning can be more inclusive of diverse student learning modes and levels of experience. However, it is not inclusive of students that need to be absent from classes for excused (student-athletes, student contents, and competitions, field trips, or conferences) or unexcused (illness, emergency, or choice) reasons. Instead of trying to replicate the in-class experience, design alternative activities that can be completed individually but incorporate some of the same hands-on elements. Examples of alternative hands-on assignments I used were attending guest lectures and seminars, designing an infographic, or writing a reflection of how the course connects to the conference or job interview. Alternative assignments can also help students who are not comfortable sharing their reasons for being absent.

Writing lesson plans

The last step in preparing to teach hands-on learning lessons is to create a lesson plan and design the activity. There are many ways to develop lesson plans, so find a template or system that works for you. Sections useful to include in your lesson plan are lesson learning objectives, pre-class activities (if applicable), list of materials needed, digital or physical resources used by teacher or students, activity logistics (group size and set-up, timing), activity introduction and closing.

Now create hands-on learning activities. Instead of preparing a lecture and selecting readings, you will be making the problem or task students will complete and gathering or creating resources and tools for them to

use. For a case study or topic discussion lesson, clearly define the problem, and collect resources that provide background and information. In a mathematical workshop lesson, write out the example and practice problems with solutions. For simulations or role-playing lessons, create realistic scenarios, stories, and artifacts for students to engage with as they try to solve the problem. To create an experiment or simulation, you need to gather or create the materials or data that students will manipulate during the activity. For both realism and to save time and effort, try to use real data or information and adapt it to your lesson. If actual data is not available, you can create it. Researchers and practitioners in the field are an invaluable source for scenarios, data, or examples. After you create the activity's content, you need to make the hand-outs, questions, or assignments that students use during the activity.

Before Getting to the Classroom

Students are often excited about hands-on learning but apprehensive because they don't know what to expect. You can help ease students' fears by being clear on what they can expect to happen and your expectations for them during the hands-on learning classes. Try to have the first hands-on learning lesson as soon in the semester as possible. The first hands-on learning lesson can be related to the class or it can be a creative problem-solving or group project.

For some or all hands-on learning lessons, pre-class instruction in or out of class might be necessary to allow enough class time to complete the activity. Anything that takes more than 5 minutes in a 50-minute class or 10 minutes in a more extended class to teach to students should be completed before class to allow enough time for the hands-on activity. However, you then need to have a way to hold students accountable for completing the pre-class instruction.

Syllabus Development

Use your syllabus to communicate to students the value you place on hands-on learning through the course grading. If hands-on learning is used regularly in the course, it would not be inappropriate to weigh it equal to or higher than a midterm or final exam.

In the Classroom

Hands-on learning will look different in every classroom because of the people involved, size of the class, size and arrangement of the room, and length of each class period. In Soil Fertility, hands-on learning took place in a traditional lecture classroom on one of the three 50 minute class periods per week. The class time was spent with a 5- to 10-minute opening, a 20- to 30-minute activity and a 5- to 15-minute closing. This setup might be very similar to what most of your classes and classrooms look like too, but you can extrapolate this discussion to fit your specific class format. While each hands-on learning lesson will look different, it helps follow a similar format so students know what to expect. A 50-minute class period is almost too little time to do a hands-on learning lesson well, and a 75-min class session would likely work better.

At the beginning of class

At the beginning of each class, you will introduce the activity and provide instructions. This part of the hands-on learning is the most crucial for the activity's success, so ensure appropriate time. Give a short (~5 minutes) introduction to the subject or skills being covered in the activity and show how the activity connects to other course topics. Give all instructions verbally while also showing written instructions on the screen or in a handout for students. Explain all the instructions or background that are essential for completing the activity. For example, when doing a case study, provide students the text of the case and give a verbal summary of important points.

Next, explain the logistics of the activity in terms as clear and precise as possible. Give instructions on student collaboration, group size, and group assignments if this has not already been established in your course. Show students where to find and how to use all of the resources or tools you provide. Explain what the goal of the activity is and how to use any worksheets or handouts. Let students know how much time they will have to complete all or parts of the activity. Last, explain to students what their end product should be, how it will be turned in, and how it will be graded. If your grading method or criteria varies from week to week, be clear about your expectations before they begin. It is advantageous to make sure that students have a copy of these instructions to refer to throughout the entire activity, either on the screen, or as a digital copy or a handout. Then, you turn them loose to do hands-on learning for themselves!

During the hands-on activity

The first five minutes of hands-on learning activity is the most difficult for the teacher because, at this point, you've relinquished the control. Give students some time and space at the beginning of the activity and while they are working.

If you feel like you should be doing something, here are some things you can do instead of hovering over the students:

1. Drink your coffee, tea, or water (hydration is important but so hard while you are talking!).
2. Organize papers students turned in, or that you have to return to students.
3. Answer that urgent email/text from your advisor/student/boss/spouse/roommate.
4. Enjoy a few minutes to yourself.
5. Watch the students work (without too much awkward staring), and you can learn a lot about how they are working together, group logistics, what parts of the project need work.
6. Make sure you have the answer or solution to the hands-on activity worked out and written down (if you haven't already).
7. Take attendance.

While giving students space to work, be aware of students who have questions, and be accessible. After giving students some time to get started on the activity, you can begin circulating through the classroom and quickly check in. Stop by groups or individuals and ask, "How are things going?", "Have you found X yet?" or even personal questions like "How has your week been?" if it won't interfere with the flow of their work too much. Sometimes asking if students have questions can limit the discussion between you and students and steer it toward problems rather than exploring interesting ideas. Try to learn students' names and address them by name while checking in with students. Sometimes, a student or group needs a minute to formulate or remember a question they have to ask you, so it can help to plan to spend a minute or two with the group before moving to the next group.

While checking-in with students, you will be able to identify groups who are struggling. Groups may be struggling with group dynamics and teamwork or understanding the concept or a step in the activity. One thing you can do is ask if they would like you to join their group for a few minutes. For group dynamic problems, you may propose a new division of labor or try to mediate any issues. Unless teamwork is one of your learning objectives, it is ok to allow dysfunctional groups to work individually or join other groups. Even if you know what the problem is and how to fix it, try to ask questions that will guide them to what might be causing the problem. Let the student

run student-centered learning, so try not to get in the way. This is one of the hardest things to do and requires developing a comfort level with mistakes and inefficiencies that happen during the learning process. The goal is to get the group or individual to a place where they can continue working on their own, and you can check back in after a few minutes to make sure they're making progress.

Closing out the class

As much as possible, stay on schedule so that you have time to debrief the activity and close the class. To conclude the activity, you can choose to review answers, collect student work, or hear reports from some or all of the small groups. Other options include a whole-class discussion, soliciting questions or feedback from students, or offering your concluding thoughts. Be clear about what students should have learned from the activity and what they will need to know for assignments and exams. If you run out of time, you can transfer some or all of the closing activities online or finish them in the next class period.

How to rescue a disaster

First, don't beat yourself up about hands-on learning activities that fall apart. An essential part of the hands-on learning process you are encouraging students to be a part of involves failures or mistakes, reevaluating, and trying again. You probably don't expect your students to get everything right the first time, so don't be surprised when you don't either. Students will be more willing to try and possibly fail if they see their teacher model learning from failure. Use your mistakes as a way for you to learn and grow your teaching.

Second, don't lie. Just tell your students the activity did not work out as you expected. They probably already know it didn't work. Instead, talk with your students about what you hoped they would get out of the activity and why you made the decisions (logistical or content-related) that you did. You may choose to invite the students' feedback on why something didn't work, their knowledge or impressions, or their suggestions. And if possible, you can

try to connect or tie in the results of the less than perfect hands-on learning activity to your topic, your class, or being a responsible citizen in the world and your field.

Hands-on Lessons about Hands-on Learning

New things are uncomfortable for everyone

When you first start using hands-on learning, it will be awkward and uncomfortable for everyone. As a teacher, the first few classes and the first semester will be challenging for you and the students. But it will get easier. Here are some things you can do to ease the transition:

1. Be positive and authentically enthusiastic about the activities. Your tone and attitude set the stage for the class.
2. Start active learning early in the course and do it regularly and often.
3. Do not accept anything less than the expectations you outlined for students in terms of participating and engagement. You do not have to be mean, but you may have to be stern for the first few weeks. If students sense that they can get away with not participating, their behaviors may continue.

Also, remember that hands-on learning might be very different from the previous educational experiences of your students. While most of us naturally prefer to learn in a more hands-on way, a traditional education experience of 12+ years has conditioned students to expect to learn in less-active ways. They may not enjoy passive learning through lectures, textbooks, essays, and exams, but at least they understand what to do and how to be successful. Students say they do not enjoy hands-on learning as much as lectures and incorrectly think they do not learn as much because hands-on learning creates feelings of frustration and discomfort as students are mentally challenged by the act of learning (Deslauriers et al., 2019). As teachers, we need to help students recognize struggle, failures, and challenges as an essential part of the learning process—but students, who

are always evaluated and ranked by their grades, may be anxious about failure. You can ease their anxiety and help them appreciate failure as a part of their learning process by deemphasizing correctness in hands-on learning. Grading for completeness and effort or allowing time and space for revision are two ways to help students move through the failure stage of learning to the correct answers. Be very clear about how hands-on learning will be graded and how it contributes to the overall course grade from the beginning of the course.

Let the content be the star, not the activity

One of the easiest ways to ruin a hands-on learning activity is for the logistics of the activity or experiment to be more complicated than the concepts students are learning. This problem is best illustrated by an example from a Fun Friday class in Soil Fertility. To teach students how to solve common fertilizer calculations and develop critical thinking skills, we used the Send-A-Problem engagement technique from Elizabeth Barkley's *Student Engagement Techniques* (Barkley, 2020). Calculation problems were printed on the outside of envelopes. The first and then the second group of students wrote their solution to the problem on a piece of paper and put it in the envelope. Then, the third group of students critically reviewed the two answers to the question and shared their reasoning. The Send-A-Problem activity did not work well in the Soil Fertility class. There was not enough time in the 50-minute class period to demonstrate how to solve the math problems, explain the logistics of the activity, *and* complete the activity and concluding debrief, so students left the class feeling frustrated and confused. The next week, we repeated the Send-A-Problem exercise with a new set of questions. However, the students still struggled with learning how to do the calculations and the mechanics of the envelopes and pieces of paper. There was simply not enough time to effectively use the Send-A-Problem activity the way it was used in Soil Fertility. The following year, we revised this lesson by simplifying the activity's logistics, spending extra time demonstrating how to solve the calculations problems, and providing multiple practice problems. In the second year, students said the hands-on calculation activities were some of the most useful that semester.

This principle also applies to technology. When Google sheets were used for the first time in a hands-on activity, students needed to spend extra time figuring out how to access the document and how to use it in the lesson before starting the exercise. It will take time for students to become comfortable enough with technology to use it to learn the course content you are trying to teach.

Don't give busywork. Assign work that is challenging.

There is a perfect middle spot between assignments that are too busy, and students see as busywork and activities that are too difficult for students to attempt, let alone be confident in finishing. Hands-on learning activities need to be challenging, engaging, and relevant. You can give students more challenging activities if you are grading their work based on participation and completeness and discussing the answers or solutions in the debrief portion of the class. Activities that are engaging and relevant will not feel like busywork to students. Case studies and discussions on issues that do not have nice, neat, right answers are more challenging than worksheets. The difficulty level is based on the background knowledge and skills students bring to your class and the time, resources, and grading that you give to hands-on learning activities.

Common Objections to Hands-on Learning (And What to Say to Them)

Sadly, hands-on learning challenges the status quo of higher education teaching, even in applied science fields. So, you will likely encounter objections or concerns about the adoption of hands-on learning. Here are some of the common objections to hands-on learning and how you might respond.

“We won't be able to cover as much content.” No, you won't. But in today's digitally connected world, delivering content is not as important as teaching students about context, critical thinking, and application, which hands-on

learning does very well. Hands-on learning can do a better job helping students understand how to use and apply information in settings similar to what they might face outside of the classroom.

“It takes too long to create practical hands-on activities. I could prepare and lecture on twice as much content in the same amount of time.” Maybe. Both hands-on learning activities and good lectures take hours to develop the first time but are reused every year with small revisions or modifications. And the amount of time that goes into creating and teaching an excellent lecture class that engages and challenges students and helps them retain information is probably similar to the amount of time it takes to develop a good hands-on learning lesson. The difference in the amount of time it takes to develop hands-on learning activities likely comes from the teacher’s skill and comfort level with hands-on learning, compared to lecture-based teaching. With time and experience, it gets easier to create hands-on learning activities.

“How do I know they’re learning what I want them to be learning in a hands-on activity?” The sarcastic answer to this is, “how do you know they’re learning what you want them to learn from a lecture?” Exams and homework often show that students do not learn what we want them to from lectures, readings, and other class activities. But with hands-on learning, you have direct evidence of what students are learning at the moment. The real concern behind this question likely is, “How do I design hands-on activities to guide students to learning what I want them to know?” and hopefully, resources like this book will help answer those questions.

“Students don’t like it and won’t do it.” Students will also say they don’t like hands-on learning. When students in an introductory physics class were taught using both lecture and hands-on learning techniques, students overwhelmingly said they enjoyed and learned more from lectures than hands-on learning, despite their grades showing the opposite (Deslauriers et al., 2019). In the beginning, you can expect some degree of resistance or lack of engagement from students for hands-on learning. When facing resistance from students be understanding that hands-on learning might be uncomfortable for some students but be clear on your expectations and use an intervention like Deslauriers et al. (2019) at the beginning of the semester. After a few weeks of hands-on learning, most students will be more comfortable with hands-on learning.

“I don’t have the resources to do hands-on-learning.” Hands-on learning is a frame of mind about teaching, not a physical requirement. With a little bit of creativity, you can do a lot with the most limited resources. Utilize chairs, tables, whiteboards, computer projectors, and any basic office supplies you have access to. You can ask students to bring their own devices and use free or inexpensive digital resources. Ask colleagues or friends if you can borrow equipment or supplies. If you cannot demonstrate an experiment or activity, there are likely online videos you can show instead and then have students practice interpreting the results of the experiment. Inexpensive poster board and colored markers were all students needed for a hands-on activity where they learned about nutrient cycles in Soil Fertility (figure 6.1).

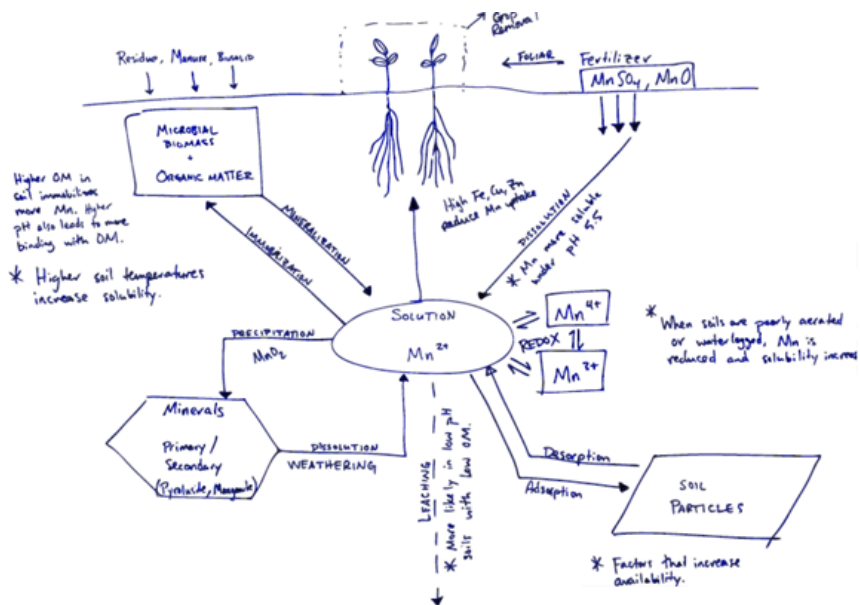


Figure 6.1 Diagram of manganese nutrient cycle drawn on a poster board by two students during hands-on learning activity in Soil Fertility.

“If students can learn on their own, then what is my purpose?” This is a question no one feels comfortable saying but some of us might relate to. Subject novices can get lost in the weeds, miss the context, have misconceptions or make mistakes, and the guidance of a teacher can prevent, smooth, or reduce these bumps in the learning process. More experienced teachers will have years of stories and experiences in their

field to incorporate into realistic hands-on learning activities. And newer teachers will be able to relate to the struggles of mastering the course content and be able to learn along with the students. But, for teachers who view their value to their students only as their accumulation of knowledge on a subject, student-guided hands-on learning threatens their self-worth. Experienced teachers can create practical, challenging, and engaging hands-on activities from their ideas, knowledge, and more expansive teaching practice.

Conclusion and Next Steps

Hands-on learning is an excellent way to engage students in the action of learning within a lecture classroom. When students are active participants in their learning, they will retain more of the information, make higher grades, and develop real-world skills. To use hands-on learning in your teaching, you need to spend time preparing before the semester and throughout the semester. All of your preparation, planning, and hard work will pay off when you can allow your students to learn and practice their course content in the classroom. There will be some challenges that you will face when you teach using hands-on learning. Still, with practice, adjustments, and some compassion toward yourself for failures, you can develop an effective teaching practice using hands-on learning.

Here are some small steps you can take toward using hands-on learning in your classroom:

1. As you teach (or learn), think about how the content you are learning could be taught in a more active, hands-on way. Similarly, collect ideas from others on how to make teaching more engaging and dynamic.
2. Do a hands-on learning experiment in your teaching. Maybe you have the time and space to redesign a course to focus on hands-on learning, or perhaps you redesign one module or section of a course to include some hands-on learning activities.
3. Remember that in hands-on learning, we expect students to make some mistakes or take a less efficient path to the answer, and your hands-on teaching experience will be the same.

Reflection Questions

- Think about a class in which you wish you had been more engaged. What prevented you from being a more active participant in your learning?
- What is the biggest barrier for you to use hands-on learning in your teaching? Are there suggestions, resources, or ideas presented here that could help you overcome that?
- Have you experienced, seen, or heard about other teachers using hands-on learning in their classes? How are they doing it?

Resources and Tools

Active learning while physically distant. Google Doc shared by Louisiana State University https://docs.google.com/document/d/15ZtTu2pmQRU_eC3gMccVhVwDR57PDs4uxlMB7Bs1os8/edit?usp=sharing.

John Spencer's blog for problem-based learning <https://spencerauthor.com/>.

National Center for Case Study Teaching in Science <https://sciencecases.lib.buffalo.edu>.

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7. Using Grade Appeals as a Learning Tool

EMILY T. OTT

Introduction

Evaluation is a critical component of teaching as it allows both instructors and students to determine progress, proficiencies, and areas that need improvement. Grades are an important form of instructor feedback that can spark discussion between student and instructor. Instructors use grades in different ways and for different purposes (e.g., solely to mark student performance, or to encourage student reflection). Student attitudes on grades range from a consumeristic/transactional view (put in a certain amount of effort to receive a grade) to a self-improvement view (learn from errors). The first part of this chapter will address using grades as a form of feedback on student performance. The second part will focus on providing good feedback while grading, including clear expectations, explanations, offering help, accessibility, and fairness.

Sometimes a student may appeal to their teacher to receive a higher/better grade. A survey sent out in the fall of 2017 at Virginia Tech demonstrates that many students who ask for a higher grade want to improve their knowledge and understanding. Students surveyed also preferred to discuss their performance with an instructor rather than receive a grade change with no discussion. For this reason, instructors may utilize informal grade appeals as a learning opportunity in a curriculum

How to cite this book chapter:

Ott, E.T. 2022. Using Grade Appeals as a Learning Tool. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

that allows flexibility and growth. Student misunderstandings of expectation may cause some grade appeals, and the frequency of these appeals may be minimized by clearly communicating objectives and offering comprehensive assessment tools such as rubrics.

This chapter will discuss...

- The historical and legal background for formal grade appeals.
- Using and encouraging informal grade appeals as learning tool for students to reevaluate their work.
- Preventing grade appeals caused by confusion and unclear instructions.
- Providing useful feedback through use of clear expectations, explanations of point deduction/accumulation, offers of help, and consistent feedback among all students.

Grade Appeal Background

Sometimes students perceive an evaluation as unfair, not representative of their effort, assigned with prejudice, or calculated incorrectly, and wish to pursue a change in the grade by appealing it to the instructor. A grade appeal is generally any instance where a student asks a teacher for a higher score on an assignment, exam, or final course grade. These appeals can be informal, where the student discusses the grade with the teaching assistant or instructor, or formal, where the requests are made at an administrative level.

The formal grade appeal process varies by university. At Virginia Tech for example, if an undergraduate student's discussion with the instructor does not resolve a grade dispute, the student can then appeal to the department or division head (Office of the University Registrar, Virginia Tech, 2020). If the dispute is not resolved at the department/division level it can be appealed to the college dean. Students seeking a formal grade appeal are encouraged to make their request as soon as possible, but no later than the end of the following term after the grade was assigned. University policy at Virginia Tech states that a professor has sole prerogative over grades assigned in his or her course, and that professors must assign grades based on established criteria rather than on students' personal conduct. There is also an appeal procedure for graduate students to follow. This process is similar, except if the dispute is not resolved at the department level, then the graduate student can appeal to the Dean of the Graduate school with a formal statement explaining his or her reasoning (Graduate School, Virginia Tech, 2020). The dispute is then reviewed by a Graduate Appeals Committee which consists of three faculty members, one graduate student, and an additional faculty member who is knowledgeable in the subject area of the appeal. The Grade Appeals Committee may hold a formal hearing, and ultimately gives a recommendation to the Dean of the Graduate School to act on with consultation from the provost.

In 1984, the American Association of University Professors (AAUP) identified teachers' "academic freedom" as: "the freedom to research and publish the results; freedom in discussing the teachers' subject matters in the classroom; freedom from institutional censorship when teachers speak as citizens." In 1998, the AAUP stated that assessing student performance is a faculty responsibility (as opposed to administrative responsibility) and that it is part of a professor's classroom freedom. However, the AAUP's statements do not have any legal standing, so there have been court cases regarding whether college or university administrators may change a student's grade without instructor approval. There have been several court cases that acknowledge a professor's right to assign grades to students, including *Regents of the University of Michigan v. Ewing*, 474 U.S. 214 (1985), which ruled that dismissing a student from a medical program for failing an exam did not infringe on a student's property rights; and *Parate v. Isibor*, 868 F.2d 821 (6th Cir. 1989) which ruled that university professors have a First Amendment right to assign grades based on their professional judgment. The United States Court of Appeals for the Third Circuit ruled in 2001 that a grade

change by an administrator does not violate a professor's First Amendment right to free speech (*Brown v. Armenti*, 247 F.3d 69, 3rd Cir. 2001)). The 6th Circuit Appeals Court stated a year later that it is a First Amendment violation if the administration pressures or coerces a professor to change a student's grade (*Yohn v. Board of Regents of the University of Michigan et al.*, 2002).

Formal grade appeals are a preventable drain on resources. Instead of filing appeal paperwork and hearing cases on panels, professors could be spending time on items in their job description (e.g. writing research grants, publishing research papers, developing class lesson plans, grading student assignments, extension work, etc.). Oslo University in Norway spent an estimated \$300 per appeals case between 2003 and 2006, which totaled \$1.2 million (Gynnild, 2011). Therefore, it is in the best interest of both professors and administrators to avoid formal grade disputes when possible.

There are resources available that help instructors avoid grading disputes. These resources are often tools that help students understand their grades, so they do not feel they received a different mark than they deserved. The AAUP has on its website a list of "practical suggestions" regarding student grades, including developing clear policies on grading standards and appeal procedures; applying appeal policies uniformly across students; making appeal policies available to students, faculty, and administrators; and including faculty in the same department or closely related fields on an appeals committee when a grade is disputed (Euben, 2001). There is a lack of higher education literature on grade appeals, and therefore we do not know how many professors consciously use tools to help prevent students from appealing grades.

Not all professors view grade appeals as negative (i.e., as "disputes"). Some professors welcome students who evaluate their grades and present arguments for a higher score. Corrada (2013) explains why grade appeals should be encouraged in graduate-level (law school) courses and defends against some concerns that faculty may have about supporting student appeals. The author describes the method that he uses in his law school classes, involving a midterm exam that encourages appeals of the exam (instead of only offering a final exam). A midterm exam was added to the courses to promote student review (where a student may learn more about a subject from mistakes made on an exam) and ensure the grade for a student or class wouldn't rely on a single grade (final exam). The author also notes that anecdotally, his students' final exam grades were higher after he started

administering a midterm exam than they were before. Corrada believes that students sometimes have good arguments to receive credit, and students sometimes deserve a better grade than they initially received. They should also be held accountable for any of his grading mistakes/lack of clarity.

As noted above, Corrada (2013) addresses concerns often voiced over encouraging grade appeals, including (1) making extra work (teaching is less rewarded than publishing); (2) Flexibility of grades/challenged authority as a teacher; (3) a high percentage of grade changes might reflect that the grades are not credible. Corrada explains that grade appeals do not need to take up a significant amount of time. He promotes the efficiency of a grade appeal/formative assessment procedure by only allowing students to submit requests that are maximum of one page long, and are turned in within one week of receiving the midterm exam grades and exam key. Furthermore, Corrada believes that students' benefit is more valuable than the marginal extra work of an appeals process. Regarding the flexibility of grades, Corrada explains that some grading is objective and that a professor may assign letter grades (A vs. D). Still, finer distinctions (A vs. A-) may sometimes be subjective and imprecise. Corrada does not believe that a high rate of appeals for his midterm exam (historically around 70%) lowers his grades' credibility or challenges his authority. Many students already believe that grades are subjective and not perfect. Hence, an appeals process allows students to think critically about their answers, what they got wrong, better defend their answers, and question their previous assumptions (Corrada, 2013). For these reasons, grade appeals may translate well to undergraduate college courses and especially advanced courses that build upon the basic knowledge of subjects.

Dealing with formal grade appeals takes time and effort away from other tasks on both the professor/departmental and administrative scales. It is in instructors' best interests to reduce the number of formal grade appeals. Instructors can use informal grade appeals (the type discussed in this chapter) to deliver student feedback and allow for growth. Using grading as an intentional form of instructor feedback while maintaining transparency expectations and consistency among students may help in student learning (Corrada, 2013).

Fall 2017 Survey

The purpose of this study, carried out in the fall of 2017, was to understand student attitudes on grade appeals and identify ways to minimize the occurrence of grade appeals (where desired by the instructor). The anonymous student survey was composed of 20 questions, including both multiple choice and short answer. The author (Emily Ott) sent the survey to the undergraduate listserv for the Crop and Soil Environmental Sciences Department (CSES), which has since been renamed the School of Plant and Environmental Sciences. There were 26 respondents out of approximately 60 undergraduate students in the CSES department at the time. There was a potential for a response bias for “overachievers” taking the survey; however the responses were ambivalent that this was the case. Also, since the survey was anonymous and was sent out by a graduate student with both name recognition and good rapport with students as the instructor of a required course (Soils Lab), it is reasonable to assume that some students filled out the survey to be helpful. Overall, the survey responses—from undergraduates who were majoring or minoring in the department—depict student perceptions of grade appeals in a Crop and Soil Sciences department. Results are both displayed in tables and discussed below.

Table 7.1 Student self-reported frequency (N) of appeals by assignment type.

Response	Assignment/ In-class work	Quiz/Exam	Essay	Course Grade
Never	13	15	17	20
Rarely (~once per semester)	10	9	8	5
Somewhat often (>once per semester)	2	2	1	1
Very often (≥once per semester)	1	0	0	0

Half of the students surveyed have never requested a higher grade on an assignment, quiz, essay, or the overall course grade. The requests that were made were made more often on homework and in-class work. A higher frequency of requests on homework and in-class work makes intuitive sense

since courses often have more graded work in the form of assignments than as exams or essays (i.e., there may be only a few exams and one course grade, versus weekly assignments). On the other hand, one might expect that students would be more likely to appeal more significant grades such as exams and the overall course grade because these grades hold more weight, with the assumption being that students are more concerned about their grades and not their understanding of the material. The results shown in Table 7.2 indicate that this assumption may not be accurate: Of the respondents, most (20/26) felt that their grades are rarely unfair, and 0 students felt that their grades were very often unfair.

Table 7.2 Student responses to the question “How often do you feel/believe that your grade on an assignment, quiz, exam, or essay is unfair?”

Response	Frequency
Never	1
Rarely (~once per semester)	20
Somewhat often (>once per semester)	5
Very often (≥once per semester)	0

Tables 7.3-7.5 below display the responses for three questions related to instructor feedback. The majority of students felt that their instructors only provided them with detailed feedback somewhat often (17/26), and responded that detailed feedback causes them to appeal grades less often (15/26). The timing of feedback (whether students receive grades or feedback quickly after turning in an assignment) did not influence respondents’ decision to appeal a grade (15/26). These results suggest that if an instructor takes the time to provide detailed feedback, students may be more accepting of their grades.

Table 7.3 Student responses to the question “How often do your instructors provide you with detailed feedback on assignments?”

Response	Frequency
Never	0
Rarely (~once per semester)	7
Somewhat often (detailed feedback for some classes/assignments)	17
Very often (every class or nearly every assignment)	2

Table 7.4 Student responses to the question “Does the feedback you receive influence your decision to ask for a higher grade?”

Response	Frequency
Yes – I (want to) ask for a change in grade less when receiving detailed feedback	15
Yes – I (want to) ask for a change in grade more when receiving detailed feedback	1
No – The feedback I receive does not influence whether I want to appeal a grade	6
Not sure	4

Table 7.5 Student responses to the question “Does the timing of grading/feedback have an influence on your decision to ask for a higher grade?”

Response	Frequency
Yes – I (want to) ask for a change in grade less when grades are posted quickly	5
Yes – I (want to) ask for a change in grade more when grades are posted quickly	3
No – Timing does not influence my decision to ask for a higher grade	15
Not sure	3

Table 7.6 shows the results of questions about the instructor’s response to grade appeals. When a student asks for a higher grade or clarification on an assignment or exam, the instructor may respond with either an automatic decision or a discussion. For most students surveyed, their experience with appealing a grade “usually” resulted in a discussion rather than an automatic decision (15/26). The response to this question shows that professors already have discussions with students about their grades, as opposed to automatically deciding whether to change a grade, which is the first step towards incorporating grade appeals as a learning tool.

Table 7.6 Student responses to the question “When you ask your professor for a higher grade on an assignment or exam, how often does it result in an automatic decision (change or no change) vs. a conversation?”

Response	Frequency
Very often/always an automatic decision	1
Usually an automatic decision	0
Results are 50% automatic decision, 50% discussion	6
Usually a discussion	15
Very often/always a discussion	1
(no response)	3

When asked about which outcome they preferred (discussion or automatic decision), most students said they liked to discuss the grade with the instructor to better understand why they were wrong. Only one student responded saying that they preferred a discussion because the instructor would not view it as a ‘handout’ or free grade change (i.e., receiving a better grade automatically without the student having to redo their work). Some example responses to the question “Do you prefer one of the results from the previous question—the instructor making a decision directly following your appeal, or a discussion about the assignment/exam and grade? Why?” are:

- I prefer a discussion to occur. When I ask for a higher grade, it is because I believe I followed a rubric or answered a question correctly despite losing points. Sometimes, it is a simple error (such as counting up points incorrectly). Other times, I learn that I did not understand the question properly and then I accept that I do not deserve those points OR I explain my thought process and the teacher realizes the question was a poor question. On the rare occasion, a teacher does not care and refuses to even discuss the test/paper.
- I don’t have a preference. It depends on the circumstance. If it’s an obvious, difficult to refute mistake, I don’t want to discuss it (I just want the points). If it’s subjective, I prefer to discuss it.
- I would prefer to have a conversation than an automatic decision. I’m at the point in my academic career where I want to understand exactly why something I did was incorrect and how to not make that mistake again rather than be awarded points just for asking for them.

- Discussion because it's normally not just me with the issue.
- Discussion. Even a quick talk can help clear up a lot. If no feedback is provided, I often don't understand what I did wrong. If feedback is provided, it still may be unclear to me. A quick follow-up with the TA/professor usually clears this up immediately or with a little more work on my part (i.e., hear their opinions and then look at my notes).
- I like to discuss so that I don't seem as if I'm looking for a handout.
- I prefer a discussion over any sort of direct results because if a grade gets changed that quickly, it just reiterates grade inflation and encourages students to learn simply for the grade rather than the knowledge.
- I would prefer a discussion because then I know how the teacher feels and what I can work on specifically.
- Discussion. Better clarify what I and my professor can do better in the future.
- A discussion makes it easier to understand the perspective of the professor on how/why they graded the way they did and it gives you the chance to better support your case as to why asking for appeal. Especially if a rubric is vague or if neither a rubric or comments are provided.

Tables 7.7-7.9 present the results of three questions related to rubrics and other assessment tools. Half of the students responded that they are less likely to appeal a grade when they receive tools such as rubrics. However, rubrics and other assessment tools were only provided “very often” for 23% of students (6/26), and these tools were “always” or “very often” helpful for only 8% (2/26). Overall, students felt that detailed rubrics and assessment tools resulted in them requesting a grade change less often. Based on these results, there seems to be room for improvement in the frequency with which rubrics are used in these students’ classes, and the helpfulness of the rubrics, in order to decrease the amount of grade appeals due to confusion.

Table 7.7 Student responses to the question “How often does your professor provide you with an assignment tool (e.g., rubric) to help clarify/justify points on an assignment/essay?”

Response	Frequency
Very often- rubrics (or other tools) for every class	6
Somewhat often- rubrics (or other tools) for some classes	17
Rarely	3
Never	0

Table 7.8 Student responses to the question “Are the rubrics (or other assessment tools) you have been given helpful? (In other words, do they contain sufficient information about expectations, or just vague qualifications like ‘poor, good, great, and excellent?’)”

Response	Frequency
Always/very often helpful – clear and detailed rubrics	2
Helpful somewhat often – rubrics with some detail	18
Rarely – vague rubrics	6
Never – Rubrics are not at all helpful	0
(Never given a rubric)	0

Table 7.9 Student responses to the question “Do the tools your professors provide from the previous question influence your decision to ask for a higher grade?”

Response	Frequency
Yes – I (want to) ask for a change in grade less when receiving tools such as rubrics	13
Yes – I (want to) ask for a change in grade more when receiving tools such as rubrics	2
No – Assessment tools do not influence whether I want to appeal a grade	8
Not sure	3

The survey also asked students to give descriptions of their own grade appeal experiences. Several students responded that they felt that the instructor did not clearly write the assignment or that there was a mistake with the grade. However, many students responded that they requested a

grade change because they wanted to understand the correct answer and that the instructor was very often receptive to the discussion. Selected responses to the question “If you’ve asked an instructor to change a grade(s) while at Virginia Tech, please explain your perspective of the process. (Thoughts upon receiving the initial grade, how the instructor responded when asked, thoughts about instructor response)” are:

- Most professors are open to the process. However, the professors response varies. Some professors are open to acknowledging a mistake and change the grade (or explaining the correct answer if I legitimately got it wrong). Some teachers are open to discussing the situation, but refuse to change the grade no matter what. Rarely, professors refuse to look at it at all (this only happened once to me).
- I only ask a professor to change a grade when I honestly believe what I’ve done is correct and that it will clearly affect my overall grade. Usually, I’m confused at first with why I was wrong. Sometimes written feedback clears this up, othertimes it does not. If I can’t understand why I was wrong, I feel fine approaching the professor, explaining what I did, and then listening to the correction. I will often push until I can fully understand their reasoning, though I won’t really argue for points. I care significantly more about understanding the problem than I do about the grade.
- I’ve never asked a professor for a higher grade.
- I felt that a couple questions on an assignment weren’t worded fairly and thought he should not count those ones.
- There is a mistake when grading The adding number of each section is not correct. I asked the professor after class with my exam paper, and he checked it’s just a calculation mistake while grading.
- They have always been respectful to my views.
- no for grade but for an exam one of my teacher encourage us to go to him and explain our rational for answering problems to get more points back which I really liked.
- I want to understand why my viewpoint or understanding isn’t the correct response.
- I got a 89.67 I believe as a final grade and asked if he could round up so I’d get the A. He rounded up to a 89.7.

These responses show that students are receptive to using evaluations (i.e., grades) and feedback to enhance their understanding of their mistakes.

Implications of the Survey for Teaching

When appealing a grade, the results of the 2017 survey show that students prefer discussions over automatic grade changes. Because the students also expressed interest in learning from their errors, grade appeals can increase student learning. Professors may use appeals to increase student learning as it gives a chance for students to reevaluate their work and their thought processes. Grade appeals sometimes involve grading an assignment twice and almost always include a discussion with the student, so instructors should factor this into their schedule to anticipate appeals and “extra” grading. Providing accessible office hours to students, especially after returning graded work, is especially important in giving students the chance to appeal or discuss a grade.

Using a Grade Appeal Procedure

When using grade appeals as a learning tool, the instructor should have clear guidelines or procedures detailing the process. Policies may outline how students should make the request (e.g., in-person during office hours, through email), page length of appeal reasoning if applicable, and a deadline. Allowing students to write down their rationale for their original answer or work is a good practice in cases where they may need to defend their reasoning but is not always applicable. Grading is often subjective, and students may have good arguments or insights that the instructor did not consider. Implementing a clear process for requesting a grade change encourages the student to think critically about their work. If an instructor does not set a deadline, some students may attempt to appeal grades at the end of the semester to achieve a higher overall grade. The instructor should also apply the grade appeal guidelines equally and fairly among all students. Below is a list of items that a grade appeals policy may include.

Syllabus Development

- Procedure for a student to appeal grade (in-person discussion during office hours, written explanation/defense of answers by a student, etc.).
- Date(s) on syllabus for class discussion about graded assignment(s) where students may ask (individually or as a class) for help understanding their errors. Dedicating class time to an informal appeal, rather than requiring the process to take place entirely outside of class, keeps it equitable for all students.
- Format of the appeal. For example, will you require a new submission to completely replace the previously graded submission, or merely a written explanation/justification of answers marked incorrect?
- Method of re-grading. There are several options. For example, the number of points that a student may receive with a submission (e.g., half of all of the points deducted initially), and how the process may impact the overall course grade; the grade of the second submission of work (e.g., second essay draft) may replace the grade of the first submission; and an incorrect exam short-answer question may receive half of the missed points back, etc.
- Deadline for student appeal submissions (time after student receives feedback/grade)

Minimizing Appeals

Reviewing grade appeals and having discussions with students may take extra time, but it is likely well worth the benefit to student learning. If a professor wishes to minimize grade appeals, likely because too many requests arise from confusion, then practices such as using rubrics and clear feedback may help. It is important for professors to be clear about both their grading process and their expectations for student work before assigning grades. Providing detailed rubrics, answer keys, and examples of excellent work (such as a past student's essay or report) can help communicate expectations. Multiple examples of past student work can give students a better understanding of the professor's expectations.

Students may sometimes appeal a grade because they feel that the grade does not reflect the effort they put into the work; some students might assume that putting a significant amount of time or effort into an assignment or project will result in a high grade. Instructors can eliminate this misunderstanding by making clear whether they are grading for effort or for understanding. (e.g., if the instructor expects a polished report that is detailed and formatted well, or if they are primarily looking for student understanding of concepts). Give students formatting guidelines or report templates to save them effort on the time-consuming aspects of an assignment if they are being graded on content only rather than on content and presentation quality.

Grade appeals can be an interesting form of feedback from students on instructor performance. If an instructor receives more requests than expected, then the instructor's expectations of students may not be apparent. These appeals reflect a lack of assignment clarity rather than a student interested in learning more. If an instructor receives fewer requests than expected, there may be an issue such as students not feeling comfortable approaching the instructor for help; office hours may conflict with a common course time; the appeal policy's procedure or purpose may not be clear. Setting aside class time to allow students to discuss graded work would help students who may not have time outside of class to attend office hours. An alternative reason for fewer appeals/resubmissions than expected is that the work was not challenging enough for students, so students are not motivated to improve their understanding of the material. During the semester, the instructor may seek anonymous feedback from

students related to the course structure and appeal procedure. The instructor may ask students whether the written feedback on graded work is helpful and what could make it more useful. Students may be confused by their instructor's feedback, may not be able to read the instructor's handwriting, or may not know the instructor's feedback exists if it is deep within an online learning management system. An instructor may also seek peer feedback on rubric clarity and usefulness.

A professor can convey expectations of student work before students complete an assignment, such as by providing a list of objectives at the beginning of the assignment. A rubric is one way to convey expectations for individual assignments, and is sometimes given with the assignment instructions or when returning graded student work. A rubric may contain detailed explanations of the instructor's expectations, including examples of correct and incorrect answers if the instructor alternatively provides a rubric when returning graded assignments. Vague or generalized rubrics that do not provide detail and only list options on a scale (e.g., "poor" to "excellent") without explanation are not useful. Detailed rubrics such as answer keys may be a good option for large courses where it would be time consuming to handwrite individual feedback for each student submission.

Instructor Feedback

At the very minimum, a grade marks student performance at a specific time on a problem or concept. An informal appeal process can instead show an improvement in student performance over time. During an appeal process, or during general grading, instructors can incorporate useful feedback into evaluations to improve student learning. Grading that contains feedback rather than just point deductions is more useful in helping students to understand their errors. Writing feedback can also reinforce and remind instructors of topics or concepts that need to be clarified for the entire class that they can later address in class. Useful feedback contains clear expectations, explanation of point deduction, explanation of point accumulation, offers of help, and consistent feedback among all students.

When writing feedback on student assignments while grading, instructors need to explain their rationale for deducting points or giving points (depending on the grading style). When removing points, instructors should

explain why the student's answer is wrong, inaccurate, or lacking information. It is necessary to give feedback on how a student did not meet expectations. This kind of feedback can have a negative tone or be perceived as negative by the student, whether intentionally or not, especially if there is little acknowledgment of good/correct answers. To balance this, acknowledge areas where the student performed well, such as well-reasoned answers or correct answers to difficult questions. Include some positive feedback on performance to encourage growth.

If a student appears to be struggling based on his or her performance, offer help and follow-through. If a student completely misses the point on an aspect of an assignment and seems to lack comprehension, the instructor should suggest the student attend office hours or send an email with further questions. The student may have misunderstood the assignment directions or may need help understanding what went wrong.

Feedback should be easily accessible to students. If an instructor writes feedback by hand, he or she should make sure the handwriting is legible! If an instructor's writing is difficult for students to read, consider typing feedback instead. Typing feedback to give to students is also good personal record-keeping; it allows the instructor to easily access and refer to previous feedback when discussing performance with a particular student. If a teacher or grader types feedback and puts it on an online learning management system (e.g., Canvas or Blackboard), the evaluation and comments should be easily accessible to students. Students may be tech-savvy, but instructors should still let students know how to find feedback and graded assignments within the learning management system; consider providing this information on the syllabus.

Good feedback also requires equity. Lack of equity, or grading with prejudice, is a valid reason for a formal grade appeal. In order to grade equally, the instructor should not assume that one student values feedback more than others and write more comments on the former student's work. The instructor also should not assume that a student does not care and write fewer or less-detailed comments. Instructors should try to give every graded assignment the same amount of time/consideration. If a teacher is worried about favoring students or discriminating against individual students, they can consider having the students turn in work anonymously or semi-anonymously. (An example of students turning in work semi-anonymously would be writing their name on the last page of an exam or essay rather than the first page.) This way, the grader can evaluate the assignment without

first looking at names, which would lower the chance of accidental bias or prejudice while grading. Learning management systems may also offer a way for instructors to grade electronically submitted assignments without viewing student names.

Conclusions

Instructors may use informal grade appeals as one of many tools to help students learn in college classrooms. Especially in courses with often subjective content and assignments that include open-ended questions, essays, and exam responses, allowing and even encouraging students to appeal their grades can lead to a better understanding of the material. A survey conducted in the fall of 2017 illustrated that students overwhelmingly preferred their professor to have a discussion with them about a grade appeal rather than automatically adjusting (or deciding not to adjust) the grade. These students are eager to learn from their mistakes and develop a better understanding of the course material. On the other hand, to avoid grade appeals that arise from misunderstandings, instructors should use rubrics, answer keys, and detailed feedback to help students understand expectations and objectives to minimize the occurrence of this type of appeal. Grade appeals can be a positive element of a course and help students understand their mistakes, however it may require more planning and time by the instructor.

Reflection Questions

- What is a formal grade appeal, and why should instructors aim to prevent their students from submitting one?
- How can an informal grade appeal procedure be used to encourage student growth?
- Were any of the results from the Fall 2017 survey surprising? Why or why not?
- What are some strategies you are going to use in your classroom to minimize unwanted grade appeals?

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VIGNETTE: Does "Fairness" Get in the Way of Learning and Equity?

LEAH HAMILTON

My first teaching experiences were TA assignments that largely consisted of grading, with the occasional responsibility for creating new assignments. Usually, the grading for any given assignment was split between the instructor and either multiple TAs or me alone. Many teaching assistants have likely been in this kind of multiple-grader situation and are familiar with the rubrics, standardization, and long instructional team meetings that often result from concerns over “fairness” in these situations. As it’s a word I hear constantly in all kinds of academic meetings about course and program expectations, I want to investigate what we really mean when we say “fairness” and how a focus on so-called unfair advantages draws attention away from the intended outcomes of a course. Additionally, I want to present a few suggestions to free up the time spent litigating course administrative details without either being unfair or lowering the expectations for the course.

In my experience, the word “fairness” is almost always invoked in tension with mercy or grace in situations where a student asks for some accommodation that could feasibly be given. It represents the idea that other students, having done the work in accordance with the written course policy and undergone any associated suffering, will be angry that “lazy” students

How to cite this vignette:

Hamilton, L. 2022. Does "Fairness" Get in the Way of Learning and Equity? In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

are getting special treatment. Fairness is invoked as the more justifiable of two evils whenever a student asks for an extension without a doctor's note, wants a copy of the lecture notes, or sleeps through the final exam. I spent many hours stressing over whether individual emails fell within the precedent we'd set for excuses and extensions, asking for physical doctor's notes and pretending I had some magic power to spot fakes, and forwarding students to the dean, who would certify their mental breakdown or family illness so I didn't have to. The student who missed the exam dropped a letter grade in the class, even though it reminded me of the day I had slept through a final in undergrad and my professor let me make it up while he graded everyone else's. It was Organic Chemistry II, which I later went on to tutor. I don't know if the grace I was shown was fair. It was an unearned privilege in a class many students didn't pass. I don't know if those extra 24 hours would've made a difference for those students. But, at the same time, I was going to fail for missing the exam, not for lack of mastering the material—is it really fair, either, to penalize a student by not giving them a second chance to prove themselves? Who, really, is being served by course policies that prioritize a definition of “fairness” focused mostly on deadlines and standard policies with built-in judgments about “real” excuses that can be accommodated if the student has time to document them? Who benefited from telling the student in Functional Foods that it wouldn't be fair to give them a makeup exam without documentation of one of the acceptable excuses?

A lot of these problems stem from a desire not to make judgment calls, as an instructor, about what constitutes a valid excuse or a reasonable accommodation. I think that's a good instinct. Unfortunately, I think the policies that often follow are detrimental. Leaving the decision up to university policy and requiring someone to fit into an easy paperwork bucket or find time to meet with the appropriate offices when they're already behind *isn't fair*. Removing the burden of deciding from yourself is *not* the same thing as having fair policies. When I was a TA, I spent the most time litigating the course policies most commonly addressed by disability accommodations: assignment formats, time limits, and deadlines. It's not fair to change these after the fact, but if some portion of students will suffer or perform worse in the class only because of policies, why not build flexibility into the course from the start? Is it any less arbitrary to draw the line at *documented* disabilities when the accommodation might help some percentage of people learn better regardless? For instance, many learning disabilities are less frequently diagnosed in women (Shifrer, Muller, and

Callahan 2011). Requiring documentation as a prerequisite for flexibility means your course inherits that inequity. I'd much rather spend my time designing better assignments and talking with students about my areas of expertise than trying to grapple with such thorny questions.

The only way I've found to reclaim my instructional and course planning time (as well as my office hours and inbox) from endless administrative judgement is to refocus myself on my goals as an instructor—to teach students the course learning objectives (CLOs) by the end of semester and assign grades that communicate how well they learned that material—and accept that any seemingly easy-to-enforce line I can draw will be challenged by an edge case. Linda Nilson's *Specifications Grading* (2014) fits well with this philosophy, and since my co-instructor and I have adopted it, we've spent far less time answering endless emails about extra credit, missed deadlines, or points back on tests. In *Specifications Grading*, we tie each assignment directly to a learning objective, we communicate a clear goal that the students must meet to demonstrate their learning (and try to be flexible about the medium or format they use to do so), and if the students don't meet the goal, then we give them substantive feedback and ask for a resubmission. Resubmissions allow students to improve their grade by demonstrating that their understanding and mastery of the material has improved instead of quibbling about points. Whenever there are non negotiable deadlines or we need to limit resubmissions for the sake of our own time, we can be clear with the students about why and they're generally more understanding of the importance since we've demonstrated that we're willing to be flexible where we can be. We almost never have students approaching us to argue a grade. Instead, they open office hours with "I wanted to know if I did the statistics right here" or "I wanted to make sure I understand what I did wrong."

It may seem odd to be arguing against standardization and the identical treatment of all students, but in my experience, it's not actually possible to be perfectly logically consistent and even-handed with grading. I don't think I'm alone, either, based on the number of ethical dilemmas I've heard discussed at length in teaching groups that boil down to "how can I most fairly enforce course policy?" Pedagogical tools that emerge from a focus on "fairness," like multiple-choice tests, strict deadlines, and documentation-focused absence policies, distract from the actual stated learning objectives and tie grades to how well students can work the system. Too many times, a seemingly sensible rubric has forced me to give a worse grade to a student

whose assignment demonstrated better mastery of the material but didn't precisely follow directions or wasn't fully completed before the deadline. I'd much rather tell students that I need them to demonstrate a deep understanding by the end of the class and work with them to get there. In my experience, that requires a lot of flexibility and a continual focus on the CLOs. Sometimes, that means giving every student a second chance so that you don't have to decide whether sleeping through an exam is a good-enough excuse.

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8. How to Oversee a Laboratory Course Taught by Teaching Assistants: Experiences in the Lab and Field

EMILY T. OTT AND HANNAH Z. ANGEL

Introduction

As former graduate teaching assistants (TAs), we have ample experiences preparing for and teaching lab-based courses in the natural sciences. Here, we share strategies for teaching introductory soil science and forestry, which are often hands-on and require special instruction and demonstration by the TA. These activities involve a combination of field and laboratory work or are conducted entirely in one setting.

Our goal is to share collective firsthand experiences and provide advice and suggestions for lead instructors, TAs, and others in similar endeavors to foster a respectful and inclusive learning environment and maintain productive relationships between educators and students. If an instructor is clear and consistent in their expectations for both TAs and students, everyone involved will enjoy a more meaningful learning experience.

How to cite this book chapter:

Ott, E.T. and Angel, H.Z. 2022. How to Oversee a Laboratory Course Taught by Teaching Assistants: Experiences in the Lab and Field. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

This chapter will discuss...

- The best management practices for preparing activities and teaching students in a laboratory or field setting to enhance student learning.
- Strategies and tips for working closely with an instructional team.
- The roles and responsibilities of the lead instructor and suggest strategies for effective mentoring and training of TAs.
- Ways to incorporate lab and lecture materials in TA instruction.
- Some advantages and disadvantages of co-teaching and serving as a graduate versus undergraduate TA

Preparing for Teaching and Co-Teaching Laboratory Courses

Creating Lab Activities

As the lead instructor of a lab-based course, you may need to create new lab activities or alter existing activities to fit the goals and objectives of your course. Perhaps you want to transition to a digital learning platform to increase the use of open educational resources (OER), which include a variety of open-source information and materials for teaching and learning. Regardless of whether you are starting from scratch or revising pre-existing content, lab activities must be structured around clearly defined learning

objectives. The construction of learning objectives is the responsibility of the instructor of record, not the TAs. Additionally, it is the responsibility of the instructor, or an experienced TA, to help the TAs understand the learning objectives and utilize them in a way that reinforces the concepts or skills students need to learn or master. For example, as lead instructor of the course, ask your TAs to review what should be learned during a given lab session (e.g., learning objectives), explain or demonstrate how it will be learned (e.g., activity, task, lab procedure), and finally, evaluate the broader implications or importance of performing that activity or task using a group discussion approach. Thus, from start to finish, a productive lab session is structured around a set of well curated learning objectives that are put into practice during hands-on learning.

The creation of lab activities and learning objectives might be daunting when starting from scratch. Instead of creating brand-new lesson plans, we recommend exploring OER to gather ideas and inspiration, particularly those that deal with lab-based courses in similar content areas. Here are some example OER² that may help create new lab activities or modify existing activities, many of which emphasize agriculture and natural resource-based fields and may be adapted to class field trips and outdoor learning:

- <https://www.fortheloveofsoil.org/educate>
- <https://scienceofagriculture.org/>
- <https://learn5.open.ac.uk/course/view.php?id=2>
- <https://www.biointeractive.org/>
- <https://libguides.mines.edu/oer/findOER>

Our experience with digital learning platforms is exclusively with Canvas. However, the digital learning platform provided by a given institution should allow instructors to develop interactive learning content such as modules, discussion threads, multimedia files, and quizzes, which are some of the features offered via Canvas. In the fall semester of 2019, all of the pre-existing labs for the introductory soil science lab course at Virginia Tech

2. Some of the resources provided in these websites may not be true OER as defined at <https://courses.lumenlearning.com/suny-oercommunitycourse-understandingoer/chapter/defining-oer/>. Please check the copyright status of these resources before use, modification, etc.

(VT) were converted to online Canvas modules. This course has four indoor in-person labs and three outdoor field labs. During each lab week, students were expected to complete the weekly module, which contained all of the necessary lab materials and documents (e.g., learning objectives, expectations, preparatory videos and readings). Our rationale for creating these online modules was that students might benefit from having learning materials presented in an easy-to-access digital format in addition to the traditional face-to-face setting. Additionally, we felt that weekly modules would increase student preparedness prior to attending lab since the modules provided a central location for the required materials and were presented in a well organized and engaging fashion. For example, within modules, we posted supplementary readings, short videos, and images that depicted the topic for a given lab week. Modules also include itemized “before class”, “during class”, and “after class” to-do lists, setting up the overall lab objectives and expectations for students. The Canvas platform allows instructors to create short, low-stake “pre-lab” multiple choice, matching, or short answer quizzes within modules to help orient and prepare students for in-person lab activities. In our experience, providing concise pre-lab quizzes has been helpful for students as it gives them a sense of what they generally need to know before a given lab session and gives the TAs a sense of what topics might require more instruction. Additionally, online discussion boards post-lab offer an opportunity for students to reflect on activities and share insight and perspectives with their classmates, which they otherwise might not be able to do in traditional in-person settings. Overall, expanding a laboratory course to include some online components will likely enhance motivation and learning potential among students.

Meeting Weekly

Weekly lab meetings with the instructor and lab TA(s) are essential to a lab course. These meetings give TAs a chance to visit and familiarize themselves with field sites or understand how to conduct an indoor lab activity. Also, these meetings are an important opportunity for the lead instructor to communicate their expectations of the TAs overall roles and responsibilities and this should be done at the start of the semester. If the lab will be an indoor hands-on lab, it is the lead instructor’s responsibility to have

the lab activities set-up before the start of the meeting. These meetings typically last about two hours depending on how technical the lab is and may include demonstrations of experiment procedures or other activities. The lead instructor should practice the mechanics of the lab activities with the TAs instead of relying on written directions. During weekly meetings, ideas for improved teaching strategies may be shared and it is a good time to get to know your TAs and learn their strengths and weaknesses. If there is a lecture component to the lab course, these meetings provide a good opportunity for the instructor of the course to catch up with the TAs on where the whole class is at in terms of lecture content. These meetings also provide an opportunity for the instructor to remind TAs of essential tasks, such as how to clean up after a given lab and other housekeeping-related notes.

Your lab course may not have a lead TA (e.g., experienced graduate student who regularly teaches the course), but if it does, you should make sure to be clear and consistent about your expectations of the lead TA during weekly meetings. In our experience, the lead TA for the soils lab course at VT oversees the proper functioning of the lab room for teaching, which is crucial since there are multiple TAs (e.g., 4-5). Some professors may expect the lead TA to do much of the lab set-up and clean-up for the week, as well as run the weekly meeting. If the instructor does not communicate clear expectations regarding the lead TA's role, this will likely cause confusion among the other TAs. We suggest that for a given lab the lead TA reviews the lab procedures and activities with the TA group, while the instructor focuses on reviewing the learning objectives and content with the TAs. Additionally, as the instructor, it is a good idea to observe at least one laboratory session run by each of your TAs to provide constructive feedback and to gain insight into how labs are being taught from semester to semester. Peer observations among TAs (i.e., one TA evaluates another TA's lab teaching) may be desired for professional development purposes or in some cases required depending on the department, graduate program, etc. In this case, the TA who is teaching will receive helpful feedback from the perspective of a fellow graduate student, and the TA who is observing may walk away with some new teaching ideas and strategies to implement. This scenario may be a good approach for some TAs to learn from one another without feeling the added pressure of being evaluated by a professor. However, other TAs

may not appreciate feedback from their peers. Regardless, there should be a respectful dialogue beforehand regarding TA preference of who conducts the teaching observation.

Using TA Guides

Supporting your TAs is an important goal of any lab-based course. One great way to do this is to create detailed teaching guides or “TA guides” for short. These should be constructed for each lab session. TA guides should provide thorough details of the overall lab logistics, materials, and learning topics to prepare the TA beyond what may be possible to cover during the ~2 hour weekly lab meeting. For example, a TA guide will contain supplemental information about a given topic (e.g., sedimentary rock formation) and teaching suggestions to help students work through activities. In contrast, the weekly lab meeting is designed to run through the lab procedures and logistics, which should take precedence. Nonetheless, a detailed TA guide educates TAs on the learning topic and nuances of the lab, which is especially helpful for TAs who lack experience and knowledge in a given area. Some suggestions for what to include in a TA guide are:

- List of required supplies including details on what supplies each student needs (e.g., X number of graduated cylinders per lab bench).
- Short sections on how to “set-up” and “clean-up” the lab.
- Organized descriptions of the flow and time sequence of all lab activities. Some examples: students might have multiple procedures to complete and should start the second procedure halfway through the first to complete all on time. Also, there may be three separate lab activities, so the lab class should be split up into groups of three students and the activities be completed in rotations.
- Important street addresses, directions, and maps for field-trip sites.
- Announcements to be made (e.g., open-notes quiz next week, bring calculator, laptop, etc.).
- Common student mistakes or lab procedure pitfalls to avoid.
- Supplemental information of learning content, where necessary. Note, the required lab manual or readings for students should also be enough background information for TAs.

- Teaching suggestions relevant to the given topic (e.g., special tips on how to estimate the percentage of sand in the soil sample).
- Suggested questions to ask students and tips for facilitating discussion after lab completion.
- Example calculations necessary to complete certain activities.

Overall, the TA guide's primary purpose is to provide all TAs with clear and detailed instruction on how to run a given lab, including background learning information, procedures, examples, and acceptable answers to common student questions. These weekly TA guides should eliminate confusion and ultimately eliminate differences in teaching protocols among TAs, so that students will have comparable lab experiences. In other words, if one TA knows the lab procedure or content very well, they will be able to run a lab more smoothly than a TA running the system for the first time who might need additional help. In particular, the TA guide should have a list of supplies required for the lab procedure, including a list of supplies that should be on each student's lab desk. A supply list in the TA guide ensures that all necessary supplies are accounted for by the TA at the beginning of the lab, promoting lab room organization and teaching efficiency. Additionally, the TA guide should include example problems and solutions for the more technical labs (e.g., chemistry based lab). It is very helpful for students if the TA works through these example problems with the lab class as a whole.

Lab Assignment Grading

Grading lab assignments, reports, or group projects is a responsibility for TAs in most lab-based courses and answer keys should be constructed by the instructor or lead TA well before the start of a given semester. Answer keys for lab assignments should be organized in the order of the lab's weekly schedule and include detailed information on assignment answers and grading (point deduction, bonus points, etc.; see example at the end of chapter). In some cases, TAs may grade specific questions with more flexibility (i.e., at TA discretion) and these questions should be specified in the key. Further, short answer questions may receive a range of responses, so it is important for the instructor or lead TA to be as thorough as possible

when developing an answer key by adding many “possible answers.” TAs must use some discernment in their grading endeavors for subjective, open-ended, and scenario-based questions.

It is important for the lead instructor to be available for Q&A sessions regarding grading throughout the semester for the benefit of the TAs. Consider organizing group TA grading sessions, which will help TAs get a sense of how assignments should be graded and will increase the similarity in grading among lab sections. TA grading sessions are a particularly good idea for the first couple of graded assignments. Additionally, for lab activities that are project-based or require a results section for certain exercises and lab procedures, it is good to catalog the results of each lab section to assess trends over the semesters. Include a few tables of previous year’s results for a given lab procedure in your TA grading rubric to give TAs an idea of “what the data looks like” (e.g., soil texture data compiled across lab sections for a given semester). Keeping track of lab section results for a given lab procedure may be beneficial in the future as those datasets, if data are reasonable, can be used by students in upcoming semesters. There is an abbreviated example of a grading rubric at the end of this chapter.

Learning and Teaching Environment: Laboratory vs. Field

Safety

Before the start of every semester, instructors must discuss laboratory and field safety guidelines with TAs. University departments should have safety guidelines and a chemical safety officer should be assigned to instructional and research laboratories. The professor or lead instructor of the course should clearly communicate verbally and in writing the laboratory safety guidelines to the TAs and others who may work in a given lab room. If you teach labs, you must be aware of any potential risks to yourself and your students. What will the protocol be if a student gets car sick on a field trip? Or a student cuts themselves on broken glass? How should the TA respond if a student refuses to wear closed-toe shoes in the lab or field or simply

forgets? As the instructor, prepare your TAs by reviewing possible scenarios with them, in addition to pointing out safety equipment (e.g., first aid kit, chemical shower), exits, emergency contacts, safety protocols, and proper disposal of solid and liquid wastes.

Before the beginning of the semester, the lead instructor must write safety protocols and make them accessible to the TAs responsible for conducting labs. In your safety procedures, include specific guidelines for following safety protocols so that all TAs can similarly inform students of these protocols. For example, if a student comes to the lab wearing sandals without safety protocols in place, one TA might send the student home, and a different TA might not notice the footwear, or if they do, they may not realize that it is a safety concern. Some of your safety protocols may be left up to your best professional judgment, whereas some protocols are set forth by the university or the Occupational Safety and Health Organization (OSHA). A chemical safety officer may inspect your lab at any time, so it is best practice to enforce safety guidelines at all times to avoid paying fines from local or state OSHA boards due to safety violations. Suppose a given week's lab procedure includes relatively safe activities such as viewing topographic maps or laptop work. In that case, a chemical safety officer might still require students to wear shoes if there are chemicals stored in the lab room. To prevent a student from missing a lab because of forgetting safety equipment, you may consider providing personal protective equipment (e.g., lab aprons, goggles, plastic gloves) for students utilizing the lab room.

Lab rooms should always be stocked with the necessary safety equipment and supplies, but what about field trips? Suppose your lab class goes on field trips or conducts labs outdoors. In that case, you can prepare for this by going through safety scenarios and protocols with your TAs before labs start and make sure they are aware of how to access supplies or assistance if needed (e.g., in case of vehicle trouble). If your lab includes driving field trips, give the TAs first aid kits to keep in the vehicle. Outdoor dangers range from minor bruises, cuts, insect bites and stings, to more significant concerns such as venomous snake bites and personal health issues (e.g., dizziness, fainting, and seizure).

If your outdoor field trip requires extensive hiking in the woods, you may want to give students a list of supplies they are responsible for bringing and wearing, such as:

- Boots or sturdy closed-toed shoes, ideally waterproof and snake-proof
- Long pants, ideally tucked into socks or boots
- Bug spray
- Sunscreen
- Poison ivy soap
- Epinephrine pen for students who are allergic to bee stings
- Rain jacket
- Warm layers for cold weather
- Fully stocked first aid kit for both indoor and outdoor settings

Supplies

As the instructor of record for a lab course, it is important to keep an inventory of the supplies for lab activities. Lab supplies might include materials for lab activities (e.g., soil, rock, plant samples), glassware, paper towels, weighing tins, chemical reagents, chalk, dry erase markers, and other items. As the instructor, you may have a more experienced “lead” TA who, based on the nature of their teaching assistantship, is appointed to work closely with you to efficiently run a given lab course. Lead TAs generally have taught the lab course before and have more experience in the course topic. As the instructor, you should advise the lead TA to create a checklist of the lab supplies well before the semester begins to allow enough time for order placement and shipping. If you do not have a lead TA, this responsibility falls on you as the instructor.

One way to manage the supply inventory is to create an Excel spreadsheet organized by lab activity and date. For each lab or group of similar labs (e.g., all field labs or all chemical labs), a detailed list of supplies should be included, as well as a marking system to indicate whether an item is missing, broken, out of stock, etc. Additionally, it will be helpful to provide brief notes on the volume of supplies as well as the quality (i.e., indicating wear and tear) of equipment and other classroom resources. It is a good idea to create and provide a working template that can be used by all responsible parties

(e.g., instructor, lead TA) and can easily be reused and updated in subsequent semesters. Advise the lead TA to update the spreadsheet weekly and then submit it to you, the instructor, before the close of a given semester. Keeping an inventory of supplies on a weekly basis each semester will help reduce the likelihood of forgetting to order essential supplies before the next semester starts. Keeping an inventory of supplies is an excellent way to help manage your time as the lead TA or instructor since one of your responsibilities is ensuring that labs are “ready to go.”

Setting Expectations

As the instructor, creating a detailed lab safety guidelines document and having the TAs review it with students at the beginning of the semester creates an opportunity to set the tone for classroom expectations. In these guidelines, it is a good idea to include a brief paragraph on acceptable lab room behaviors. For example, one expectation might be that students must complete hands-on lab activities in groups, while all graded assignments must be completed individually. As the instructor, you will have acquired many years of prior teaching experience and you will have an opportunity to share your teaching tips and advice with your TAs during the weekly meetings. For example, your TAs might be hesitant to show any sort of authority when delivering laboratory expectations and safety guidelines. As the instructor, you should help motivate and inspire your TAs by sharing a real-life example of how you navigated a position of authority in front of students while maintaining a welcoming and respectful atmosphere. In our personal experiences as TAs, we discovered that the first few interactions with students are essential in establishing how they will perceive their TA for the remainder of the semester. Thus, we recommend that TAs be careful not to appear overly authoritative and strict at first, but also to avoid appearing too “laid back,” which might encourage students to “walk all over you.” In many ways, teaching is a balancing act.

During lab instruction, the TA might consider taking time at the start of the semester to meet and greet their students and allow them to get to know their classmates by using a short icebreaker activity. This icebreaker approach makes it easier to transition into the mechanics of the course, such as reviewing the safety guidelines and student classroom expectations. Also,

TAs should remind students that the ball is in their court; in other words, if everyone follows the safety guidelines, the lab and field experience will run smoothly and there will be more time for discussion, sharing stories, and capturing the fun and essence of each lab activity. Further, the use of TA guides, as discussed above, will also help prepare TAs for setting the proper tone and expectations for successful lab teaching. TA guides should contain reminders of essential points to make during the lab about safety or protocol, such as deliberately asking students to put on their seat belts during off-campus field trips. The best way to ensure that students follow safety procedures is to model good behavior as the TA. An example of modeling behavior in the presence of students is dressing appropriately for the field and dressing professionally when teaching indoors. For example, wearing long pants and sleeves may be uncomfortable in the hot months of late summer and early fall, but it is quite practical for field work since it protects against poison ivy, sunburn, insect bites, etc. Your students will be more likely to engage in good outdoor safety practices if they see their professor and TAs following them as well. For some students, your lab might be their first outdoor lab experience, so it is up to you and your TAs to let them know what to expect beforehand.

Preparing to Teach Indoors vs. Outdoors

Educating students has unique challenges both inside and outside of the classroom. For either situation, it is essential to familiarize yourself with your classroom or field surroundings. If you as the instructor or TA will be teaching in the laboratory, make sure to understand all of the features of the room before you start your first class. Once you review the safety protocols and general layout of the lab room, prepare for each lab by familiarizing yourself with the logistics of a given lab activity. If you are the lead instructor, walk your TAs through each lab's logistics during the weekly meetings as discussed earlier. For example, provide your TAs with tips and advice on how and where to begin the lab, the order of the lab activities, and how to end the class with a wrap-up discussion and summary. Before each lab, the TAs should have thoroughly reviewed the TA guides. If a TA is less experienced, you as the instructor may advise him or her to practice teaching some of the topics or lab procedure logistics in the lab room

beforehand to get a feel of the space and the technology to be utilized. While your teaching style is unique to your personality and preferences, lab teaching is less flexible and subjective since you will need to stay on schedule and conduct activities using a specific “order of operations,” so to speak. As the TA, it is necessary to practice the lab logistics and review key points beforehand, get to the lab room early on the day of your lab session, and be concise and organized during overall lab instruction. Time management is particularly important in the lab room since it helps the instructor better adapt to unexpected changes that may arise, such as lab activities taking longer than anticipated.

You have several additional considerations in the field, such as weather and vehicle use, if the field lab is off-campus. The TA guides should have detailed instructions on vehicle use, from pick-up and drop-off to parking advice, and important contacts for emergencies. Time management is also essential during field trips, especially those off-campus, requiring you to factor in driving time, heavy traffic hours, and how long you should take at each stop, as there is typically more than one area to visit. For the benefit of TAs, it is essential to conduct a dry run of the field trip to help locate and become acquainted with the area. For the students’ benefit, it is a good idea for each TA to briefly discuss the nature and objective of the lab and field-specific safety guidelines before departing the building. Framing the heart of the lab will help students better understand their expectations. Also, the beginning of the lab may be an opportunity for TAs to instill excitement and pose to students one or more questions about the topic of the day. Once in the field, it is helpful to give students interesting facts and background information about the site location and reiterate the lab’s key objectives. As you would normally do in the lab room, frequently check in on the individuals or groups of students and try to do so in a way that avoids favoritism. It is always a good idea to have a list of questions ready to ask students to help keep them focused on the purpose of the lab. Encourage students to take pictures and notes for future reference. One important consideration is to project your speaking voice in the field, as there are usually more distractions in an outdoor environment. To boost confidence, prepare for your field-based lab in an outdoor setting if you are not accustomed to teaching outside.

Setting Up and Maintaining Productive Lab Room Dynamics

Undergraduate vs. Graduate TAs

Teaching, even for a single semester, is a valuable experience for graduate and undergraduate students. Departments often require graduate students to teach one semester, including responsibilities that range from grading a few exams to overseeing a course. Sometimes these same teaching opportunities are offered to undergraduate students. Assistant teaching as a student, whether at the graduate or undergraduate level, is a great way to build a resume and gain first-hand professional experience teaching in higher education. When setting up a new course, or taking over the teaching responsibilities of an existing class, consider how you as the instructor will enlist the assistance of one or more TAs. Will these TAs be graduate students, undergraduate students, or a combination of both? Table 8.1 summarizes a few critical differences between undergraduate and graduate student TAs.

Table 8.1 Some observed differences between undergraduate and graduate TAs.

Undergraduate TAs	Graduate TAs
Unethical for undergraduates to grade the work of peers.	Able to grade undergraduate work, but may be unable to grade work of fellow graduate students.
Close in age to students.	Likely a few years older than students.
May be friends with students or know them personally.	Likely not close to students, but may have had one or two classes with a few.
They have taken the course recently, usually in the past 1-2 years.	Possibly has not taken the course to be taught or lacks experience in the course topic.
May not be allowed or trusted to supervise students alone.	Can supervise students.
May not be allowed to drive school vehicles for a field trip.	Can drive school vehicles for field trips.

Your department or university may have certain stipulations in place regarding TAs. For example, it is likely that undergraduate students at your university are not allowed to grade the work of their peers. Another possible

concern is that undergraduate TAs are often not allowed to drive school vehicles, although this is department- and university-specific. Not having enough drivers for field trips might lead to the need for volunteer staff and graduate students to help. You may work at a small college with no graduate students at all, so the only students eligible to be TAs are undergraduates. On the other hand, your department may need to find more teaching assignment positions for graduate students with assistantships, and you may only have the option of having graduate TAs.

The Student Age Gap

The gap in age and experience between a professor and their students widens every semester; with each passing year, the professor gains more knowledge by attending conferences, conducting research, and giving talks on their area of expertise. With each passing semester, the students' experiences in and out of the classroom have changed. It is essential to recognize the impact of these differences in age, experience, and culture and adapt your teaching accordingly so that all students feel like they are on the same base-level understanding of the course material and feel included in the conversation. The age gap is usually smaller between students and TAs than between students and professors, and may even be zero between an undergraduate TA and undergraduate students. The smaller difference in age between TAs and students can be helpful. For example, if the professor is having difficulty connecting with the students, they can ask for input from the TA, who may better relate to the students. If there is a small age gap between the students and TA, the students may feel more comfortable going to their TA with issues than to their professor who might appear much older and too far removed from his or her own undergraduate experience. On the other hand, a TA might be very close in age with the students and may unintentionally become too friendly in a way that compromises their professional image as an educator. If either a professor or a TA becomes too familiar with one or more of the students, it may be difficult to remain unbiased and objective while grading. The instructor should give guidance to TAs on how to maintain a professional relationship with students, for example, by limiting socializing outside of class time for the duration of the

course. Undergraduates who are potential TAs may even know students in the class personally and should be discouraged from becoming TAs until they are less likely to have their friends as students.

Considerations for Assigning TAs to Lab Sections

It would be inaccurate for us to make broad generalizations about undergraduate students versus graduate students. Undergraduate students can be "traditional" (aged 18–22) or "non-traditional." Likewise, graduate students may have recently completed their undergraduate or master's degree, or they may be continuing their education after being in the workforce for years in the same or a similar field. Thus, experience and age levels may differ quite a bit. However, the roles and responsibilities of undergraduate and graduate students are easier to generalize. Undergraduate students typically take several courses in one semester, with 14–20 credit hours per week of coursework before factoring in homework assignments and class projects. Many students have a part-time or full-time job on top of their schoolwork. With these additional responsibilities, it is crucial to determine how much time you would require from an undergraduate TA and whether the time required to be an undergraduate TA would realistically fit into their weekly schedule. Ideally, an undergraduate TA would be either paid as a student worker or given independent study course credit, but this is not always possible, so be sure to check with your department. In contrast, graduate students often have assistantship contracts that factor in their time as TAs, so be sure to work with your department's Graduate Program Director or other person who works directly with graduate student contracts and the assignment of TAs. Depending on the student and their contract, there may be only 10–20 hours of teaching assigned per week. All of these details must be understood well before TAs are assigned to lab sections and certainly before the semester starts, as some students may only be able to teach one lab section based on their semester course load or graduate contract. Additionally, undergraduate students (due to their class schedule and experience level with the course material) will likely need to serve as a "lab assistant" who is paid hourly to help with laboratory set-up, clean-up and some in-lab activities under the supervision of a graduate TA.

Hiring an Undergraduate TA

A great way for the lead instructor to recruit undergraduate TAs is to treat the situation as a job that includes a job posting and an interview. Posting a job announcement may also be an effective way of choosing a graduate TA, although departmental procedures on TA assignments may not give you as much flexibility. The instructor may title the job posting as “undergraduate TA position”, unless independent study course credit is offered in lieu of a paid hourly position. Creating this posting will allow you to consider and outline your expectations for the undergraduate TA. Your undergraduate TA will have an understanding of their role and responsibilities. A job posting with defined expectations for the TA position is useful even if there is only one student who will apply because it defines your expectations clearly, which is crucial in managing any professional relationship. We also suggest that you do not show favoritism and automatically grant a TA position to the “best” student in the previous class. Great TAs are not necessarily the students who made no mistakes on their work or were persistent in asking questions during class. A great TA will be able to communicate the material effectively to help students understand and learn. We suggest that you set up an interview with your prospective undergraduate TA to get to know him or her a little better and gauge whether they would make a good TA for your lab. Here are some questions that you might want to consider when selecting an undergraduate student to fill a TA position:

- **Does this student know their potential students very well?** The student might be classmates with lab students in another course. An obvious conflict of interest arises if the student is friends with students in the class.
- **How was this student’s performance in the course when they took it?** A good TA does not necessarily need to have received A+ grades in the course previously, but their previous coursework should show a level of understanding that would allow them to be able to explain concepts to other students. Attending pre-lab meetings and going over the professor’s lab content helps reinforce the student’s subject knowledge.
- **Is the student interested in teaching, or would they prefer to perform other tasks?** For example, the student may be interested in instructing in-lab, or they may rather help with other tasks such as grading

assignments, helping design activities, setting up, and cleaning up.

- **Is this student calm and confident, energetic, mature?** Maturity is an important quality for a TA. A TA should be prepared to assist and lead students if something goes wrong such as a fire, a chemical spill or burn, a student injury, a student health issue in the field, extreme weather in the field, etc. The TA should know about lab safety in addition to the course material. If the student seems too excitable or immature, they may not be ready to be a TA or may need extra guidance from you to teach and lead peers.
- **Is the opportunity to be an undergraduate TA limited to one student per lab section?**
- **Has the opportunity been announced fairly so that all interested students may pursue the opportunity?**
- **Why does the student want to help teach? Is there a genuine interest in assisting other students in learning?**
- **How much effort are you willing to invest in teaching an undergraduate how to teach?** If you only want an undergraduate TA to assist with grading and do not expect to mentor the student on their teaching, then maybe having an undergraduate TA is not a good idea. Enlisting the help of an undergraduate TA will not necessarily lighten your teaching load. If anything, it might require more time! You might have a graduate TA who you trust to mentor an undergraduate student on teaching, granting the graduate student a unique opportunity. Additionally, having your graduate TA train and mentor the undergraduate TA gives you less responsibility and work so that you have time to focus on other more pressing tasks.

Additionally, you as the instructor may assume that an undergraduate student only wants to be a TA as a resume-filler or to simply have an on-campus job, without caring much about gaining hands-on teaching experience. You may be right, as students and young professionals are constantly faced with the pressure to have impressive resumes of extracurriculars and job experience. If multiple students express an interest in a TA position, each student's reason for that interest may be more critical to address than the student's grade and performance in the class and we recommend that you directly ask the student, "why are you interested in this position?" during your interview. Put another way, a student who received an A+ in the class may not be invested in teaching versus a student who

received a lower grade and does express an explicit interest in teaching. Good teaching does not come solely from expertise in a field but rather from an interest in communication and self-improvement.

Establishing an Atmosphere of Respect

Academia is undoubtedly a place of hierarchies. In certain areas of academia, the hierarchy and roles may be well established (i.e., tenured professors, adjunct professors, etc.). Still, it is up to you as the lead instructor to establish your personal "chain-of-command" to set clear expectations that foster respect in the lab room. It is essential to communicate these expectations to your TAs and students as they may be much different from the expectations of other professors'. In this section, we will introduce some questions to consider before the semester begins.

Do you want your TAs to call you by your first name or Dr. [Surname]?

Do you expect them to refer to you as only Dr. [Surname] in front of students, or is it okay for them to refer to you more casually?

These two questions form the basis of your (instructor) relationship with your TAs and students. Your answer to these questions likely will depend on how you view your TAs—as young professionals who are capable of managing a lab section or as your subordinate and surrogate teacher. As the instructor, are you going to manage down to your TAs or are you going to work with them? Would you like to be referred to as Dr. [Surname] in front of students to reinforce your authority as someone who holds a doctoral degree and is an expert in your field? How will your TAs address you in the presence of students? One consideration is that students may appreciate that the relationship between the professor and TA is different than the relationship between the professor and student. Depending on how you view the graduate TA role, we find that allowing graduate TAs to refer to the course professor in a casual way helps the students view the TA with greater authority and respect. Establishing a closer relationship between the TA and the course instructor is preferred, particularly if the TA oversees one or more lab sections or is at the stage in their program where they are considered a Ph.D. Candidate.

How much grading responsibility does each TA have, and how much does it affect students' grades?

As the instructor, your TAs could oversee a lab section and supervise students without your supervision, or your TAs may just help with grading behind the scenes. Maybe the role of your TA is to assist during labs with no grading involved. The more TAs are involved with grading student work, the more critical it is to foster a respectful relationship between TAs and students. As discussed earlier, verbally communicate your expectations to your TAs during the first couple of in-person meetings at the beginning of the semester to be sure that everyone is clear and comfortable with their roles and responsibilities. Additionally, it is a good idea to develop a "Lab Management Plan" written document before the semester begins. This document is different from the weekly TA guides because it does not focus on how to effectively run one specific lab session, but rather it serves as a set of best practices that the TAs can utilize for all labs throughout the semester. In other words, the lab management plan is a comprehensive guide that helps TAs in the lab course be more confident and successful in their instruction given the unique nature and nuances of the course. This lab document should be adapted to your specific lab course and might include the following sections: lab course overview, student-teacher responsibilities, communication, learning assessment, time management, accountability, attitude of teacher-classroom, and enforcing lab safety guidelines. These sections would ideally provide details on the roles, responsibilities, and expectations of TAs to avoid misunderstanding and confusion as the semester progresses.

How well do you know the course material? Do any of the TAs know the content better?

As an educator, whether an associate professor or graduate TA, no one expects you to know everything. You may even want to emphasize this to your students at the beginning of the semester. The course that you are assigned to teach might include some of the fields you are an expert in and some content from fields outside of your expertise. Even as the course instructor, you might encounter students or other TAs who are more knowledgeable in a particular area. One way to handle a lack of knowledge during your teaching experience is to simply acknowledge your level of understanding of a specific topic to the students or other TAs. Expressing humility and learning from others despite being the authority figure in the classroom is a productive way to foster a collaborative learning environment

among the instructional team and students. Students can often tell when their professor does not know the content they are teaching, so you cannot “save face” by pretending to know better than you do. As the instructor, expressing humility where necessary, showing respect for your TAs, and modelling professionalism is a simple way for students to gain your respect.

Attending a Lab Section Respectfully and Productively

This section addresses how to foster an atmosphere of respect when present and involved in lab sections taught by TAs. Not being cognizant of this particular topic may be detrimental to student learning and compromise professional relationships. As a professor, you have every right to attend or sit-in on the lab sections in your course; however, we encourage you not to underestimate the importance of attending lab sections respectfully. At the beginning of the semester, and possibly before the semester starts, if this is the first time you are teaching your course, think about how and why you might attend lab sections. For example, some professors teach lab sections themselves, and have TAs in the lab to assist students with procedures. Table 8.2 summarizes a few lab teaching scenarios and how they relate to the professor attending lab sections. The bulk of this chapter (and our experience) deals with Scenario B, but we would like to present Scenarios A and C as additional options as there are different levels of instructor involvement in a university lab course.

Table 8.2 Teaching scenarios in the lab room.

Scenario A: Professor-Led Lab Sections	Scenario B: TA-Led Lab Sections	Scenario C: Professor Co-Taught Labs
<ul style="list-style-type: none"> • Professor teaches every lab section. • Course may have 1-3 lab sections. • TA may grade student work, but not teach a lab section. • TA may tutor students individually during lab and outside office-hours. 	<ul style="list-style-type: none"> • TAs lead lab sections, usually 1-2 sections per TA. • Professor may visit the lab occasionally to "check-in". • Multiple labs may meet at the same time (e.g., large chemistry lab classes), or only one lab section at a time (e.g., smaller classes with one lab room). 	<ul style="list-style-type: none"> • Two professors alternate teaching of labs or lab weeks (e.g., based on the course unit). • Instead of alternating labs, two professors (or TAs) may split up teaching responsibilities within a single lab session. • Usually, 1-3 lab sections per course. • May or may not have a TA to assist.

If you as the instructor have TA-led labs you should establish with your TAs at the beginning of the semester whether you will attend a lab section, and if so, on which specific date(s). Visiting a given lab section can take many respectful forms, from poking your head into the room to quietly sitting in for the entirety of the lab class. You should also estimate how often you will attend (e.g., the first few lab sections, a couple of times throughout the semester), and stick to your word. Do not make any surprise visits, and do not create a promise of attending without following through. If it is the TA's first-time teaching, they may already be nervous speaking in front of students and might be slightly more at ease without you watching, which may improve their teaching performance. Consider what type of presence you would like to have when visiting a given lab section (e.g., passive approach versus a more hands-on and vocal approach) and communicate this to your TAs. You may even ask your TAs what they prefer. Regardless, we recommend that the instructor discuss with their TAs the reasons why they may want to attend one or more lab sections to help alleviate any nerves associated with teaching for the first time under supervision.

Further, If you (instructor) have more than one TA and lab section, you should attend all sections equally. If there is a lab section at a certain time that you cannot attend, you should consider not attending other lab sections for consistency among the TAs. Another option is to ask another professor

or graduate TA to observe that section if your goal is to conduct a formal teaching observation for all of your TAs. Consider how your presence in the lab might be a distraction to the TA and students and might give one lab section an advantage if you are never present to observe due to a conflict in schedule. Instead of attending the lab sections, we suggest that you make yourself available during the lab times and let your TAs know you will be available if they need any assistance. Hopefully, your office will be close to the lab room, but if not, you can let the TAs know that they can send you a quick email or text message if they need your help. It may be convenient for you to attend a specific lab section more than others, but attending one class more often can make the TA feel uneasy. Even if it is the only section that fits into your schedule, and the TA knows this, it can still feel like you are giving the TA more attention than the other TAs, which may be unhelpful or perceived negatively (if, for example, you are correcting the TA after a mistake, answering student questions before the TA can respond, etc.). Overall, it is important to set fair and equal boundaries among your TAs to cultivate respect.

When you as the instructor attend your TA's lab section, you should establish with your TA what you plan to do during the lab. When you attend the lab section, will you arrive at the start of the lab? Or will you visit partway through? Do you want to observe quietly, or do you want to help your TA if they are unclear when instructing students on the lab procedure? Do you simply want to be there for assistance, such as answering student questions? One way to respectfully attend the lab section is to be there when the lab session starts, introduce yourself, introduce the TA, verbally "hand over" the lab to the TA, and then either sit down or leave the room. Letting your TA know how you will use their lab time will allow them to plan accordingly. Another consideration as the instructor is that if you interfere during any of the lab instructions, this might frustrate and "throw off" the TA, negatively impacting their teaching performance. On the other hand, if you quietly sit in the back of the room to observe, you can get a good idea of how the students handle the lab procedures and what kind of feedback might be useful to the TA. As mentioned earlier, it is a good idea to ask your TAs if they prefer when and how you visit and observe their lab sections. Regardless, it is important to set these sorts of expectations ahead of time so that everyone is on the same page and understands how a lab session will operate when the instructor and TA are both present in the lab room.

If you plan on having TAs lead your lab sessions, respect your TA's authority in front of their lab students. Interrupting the TA, contradicting what the TA says, answering student questions before the TA can respond, and many other considerations may lower the TA's authority over their students and negatively affect the lab room's student-teacher atmosphere. As a TA, establishing a tone of civil authority is crucial in the first few weeks of the semester and will help build rapport and trust with students. As the instructor, if you happen to hear the TA say something incorrect, we recommend that you refrain from interrupting to correct them unless it is particularly urgent. Everyone makes mistakes or misspeaks, and sometimes little corrections are not needed (e.g., if a TA writes "Ca" on the chalkboard but says "Ca²⁺", it is clear that the TA meant the common valence charge of "two plus" when writing it on the board). If a correction is needed, then you can quietly talk to the TA on the side (e.g., "I heard you tell the students that the answer to question three is only [certain answer], but [another answer] is also acceptable for [specific reason]"). This way, the TA can then address the students and announce their mistake and perhaps write it on the chalkboard, and you have corrected the issue without interfering with your TA's lab room. Avoiding interruptions in an ongoing lab session also gives the TA a great way to build trust with their students. We have learned that students are more likely to respect an instructor who admits to a mistake and clears up a misunderstanding for the student's benefit. Recognizing and correcting mistakes gives the TA a good chance to display humility; we all get things wrong occasionally. It is critical to correct ourselves in front of students! Also, if you are a professor, you do not need to "one-up" your TA, or vice versa. Your students are aware that you are the course's main instructor, and the TA is still a graduate (or even undergraduate) student.

In summary, when considering whether or not to attend lab sections regularly, you should consider how many chefs are "too many for the kitchen," as the saying goes. Co-teaching lecture courses without a cohesive plan does not work well, and it does not work well for labs either. The topic of co-teaching will be discussed in more detail in a later chapter. Consider how the instructor-to-student-ratio might affect student learning. Will the students feel intimidated with two sets of eyes watching them instead of one? Will the students know who to ask for help? Will the students feel comfortable making mistakes and learning from those mistakes in front of both instructors? Make sure the students and the TAs know and understand what your role as the instructor is when you are in the lab room versus the

lecture room. Additionally, it might be helpful if either the instructor or TA announces to the students at the start of a given lab session what the role of the instructor will be in the lab room.

Here are examples of what to say when you attend a lab:

- “Good morning students, today I’ll be sitting in to observe the lab session. I’m working with the TAs to do teaching evaluations, so I’ll be sitting in the back taking notes. Please pretend I’m not here and direct all questions to your TA.”
- “Hello everyone, I wanted to come to the lab today because this is my favorite lab of the semester. TA will explain the procedure and get you started as usual, and I’ll also be here to help you as you go and answer questions.”
- “I’ll be driving one of the two vans for our field trip today. Once we get to the site, I’ll hand over the lab to [TA name] as usual.”

As the instructor, attending lab sections that are led by your TAs is fine and, in some cases, highly encouraged. However, we suggest visiting the labs thoughtfully and with the intent to maintain students’ respect for their TA and you. Asking TAs what they think of the above points is also an excellent idea to make them feel their opinions are valued. Failing to consider all the points discussed above may cause frustration for the TAs and students, ultimately resulting in a poor teaching and learning environment.

Mentoring TAs to Ensure Effective Teaching

If you as the instructor view your relationship with your TAs as a mentor instead of a manager, you are more likely to gain TA and student respect and foster active learning. Your TAs are likely learning how to teach, so it is your job to help them in the process. If you as the instructor lack teaching experience or you have no training in education, then there is no shame in learning with your TAs. An example would be to devise an active learning activity, for either lecture or lab, and ask your TAs to assist in the activity and provide feedback. A lot of teaching is simply trial and error. Seeking out pedagogical resources, many of which are open access online, would be a great task to do *with* your TAs. After exploring some

educational training resources online, use the weekly TA prep meetings to brainstorm better ways to present the learning objectives at the beginning of a given lab and the discussion component following activities at the end. Take this meeting time as an opportunity to explore and try new teaching methods that are low-stakes and do not necessarily change the main goals and objectives of a given lab. Additionally, supposing you are not formally trained in education, it is not advisable to direct your TAs to perform specific pedagogical practices in which you have no experience. Even if you have education training, it is better to mentor rather than manage your TAs teaching style, giving them the room and flexibility to learn and evaluate their teaching as they desire.

One aspect of mentoring is providing evaluation and feedback to young professionals where necessary. Remember as the instructor to give criticism sandwiched between compliments and positive comments; the TA will be less likely to take your feedback into consideration if it only focuses on the negative aspects of their performance. Help your TAs recognize the importance of maintaining a growth mindset by sharing experiences of how you as an early educator struggled to improve in certain areas and succeeded in the end. If you plan to evaluate a TA, do not sit in on their lab unannounced or without an observation plan, but rather be clear and transparent on how you will conduct an observation. For example, are you going to jot down some notes, or will you use a form? When and how will you discuss the assessment with the TA? It is not appropriate to discuss a TA's evaluation in front of other TAs or students. If you have multiple TAs, then all of them need to be equally evaluated. Typically, teaching evaluations are required for internal purposes by your university department. Even if you are not planning or required to conduct teaching evaluations, keep in mind that one of your TAs might request one for professional development purposes. Your TA evaluation efforts can be used later in a reference letter or teaching portfolio.

Utilizing TAs in Various Components of a Course

Teaching assistants can be wonderful assets in a professor's lecture class and their fellow TAs' lab sections. Their participation can include guest lecturing, co-teaching with other TAs (discussed below), proctoring exams, and helping other TAs during particularly resource-intensive and time demanding classroom or lab activities. If your course has a laboratory section, it likely includes a lecture section as well. As the instructor, consider if you want your TAs to attend the lecture sections to better understand what students are learning. Having your TAs attend lecture classes might help them teach more effectively in their lab section(s) and it is especially helpful if they lack experience in the subject area or if it is their first-time teaching. However, your TAs might already be busy teaching a 3-hour lab once or twice a week and spending another 1-3 hours per week preparing for the lab, grading assignments, and addressing student questions through email and in-person office hours. When requesting the attendance of your graduate TAs in the lecture, consider their teaching appointment (i.e., 10-20 hours per week) and the fact that they are also working on their research in addition to the teaching assignment.

If you require TA attendance during the lecture, then try to make good use of their time. Some examples of TA lecture duties may include passing out and collecting papers, helping students with classroom group work or activities, keeping track of attendance, and watching for students who are struggling. If you only want TAs to attend the lecture so that they are aware of the lecture material and schedule, consider an alternative to save your TAs some time in their schedules. For example, you may inform students during weekly lab meetings about what was covered in the lecture, whether you are on schedule or behind, and so on. Guest lecturing is a valid option to have on the table and it is an excellent learning and resume-building opportunity for graduate students. Additionally, guest lecturing may help professors with their workload and semester travel plans. Further, one of your TAs might specialize in a particular topic due to research experience or because they have taken many courses on the subject. Students taking the class will likely gain new perspectives and encouragement for pursuing advanced degrees if they observe and learn from a graduate student who is guest lecturing. Further, just as you (i.e., lead TA or professor) should communicate with your TAs regarding their roles in the lab room, you should also express your

expectations of TAs in the lecture portion of the course, if one exists. If you would like for the TA to help students work on an in-lecture exercise, demonstrate the task and expected results to the TA before class. Although the TA may know the course material quite well, this does not guarantee that they can follow a specific problem if they are put on the spot in the lecture room without first being adequately prepped. The TA may provide a different answer that is correct, but not one that you considered, or the TA might provide an incorrect or unhelpful answer; thus, it is best to make a plan beforehand so that everyone is on the same page. Additionally, one TA might have suggestions for improvements to the lecture lesson plan or concerns about the feasibility of a particular in-class activity. Thus, preparing your TAs for the in-lecture exercise beforehand and having a discussion afterwards on what went well will help build upon the professional relationship and improve the teaching and learning environment for everyone.

Undergraduate TAs and sometimes graduate TAs, if they attended the same university for their undergraduate degree, may have recently taken the lab course to be taught. A TA that has recently completed your course might give a unique perspective to your class. For example, if you have a TA who has taken your course, this TA may provide you with better insight into whether certain lab activities worked for the students. If you make small changes to your course every semester, asking this TA for insight could be incredibly helpful. They might tell you that a particular lab required much more explanation than given, but that the students were too confused to ask for help, so you might not have noticed. Or, the TA might inform you of topics that the students found especially interesting. The smaller the age (or experience) gap, the more relevant the insight your TA will be able to give you when you are developing and making changes to your course. Conversely, a graduate student who took a similar course with a different professor at another university may offer insight and other ideas that you may decide to incorporate into your lab course.

Fostering a Positive Learning Environment

An essential part of being an educator of any sort is making everyone in the classroom feel welcome. Teaching laboratory-based courses requires students to work closely with others and be comfortable asking for help, especially since lab activities are almost entirely hands-on. Thus, reassuring students and even other TAs that you (instructor) are here to support them in your highest capacity is an effective way to boost morale and increase learning for all. In the lab, there will be a variety of students with different backgrounds and experiences. Since there will also be a variety of preferred learning styles from students in the classroom, we advise TAs to mix up their teaching style to include passive and active forms of engagement during each lab session. For example, instead of asking questions by calling on individual students during pre-and post-lab discussions, opt for allowing students to form group discussions first before sharing with the entire class, or pass around notecards for students to write down their answers, which is particularly helpful for more introverted individuals.

At the start of the semester, make sure to review the resources your university provides for students with accessibility issues. As the instructor, make sure to educate your TAs on the proper protocols for accommodating students with disabilities (e.g., the deadline for students to provide an accommodation letter). As the lab TA, be sure to remind students of your office hours and frequently offer help sessions outside of the scheduled lab class. Other considerations for improving the learning environment as the instructor or TA would be to write a diversity statement in the front matter of your lab manual and utilize pronouns (e.g., she, her), encouraging students to feel comfortable doing so as well if they wish. Another important consideration is the accessibility of instructional materials, whether as a word document (e.g., syllabus, lab manual) or educational video. There are many online resources that help guide instructors on how to convert online documents, handouts, and videos to more accessible versions for students, from providing hyperlinks in Microsoft Word to generating captions for videos and other media. Visit this webpage to find several resources and articles from the National Center on Disability and Access to Education: <https://ncdae.org/resources/>.

Another consideration is including TAs in the preparation of lab activities. For example, it might be helpful for you as the instructor to request constructive feedback during weekly meetings and, if necessary, recruit help in designing or reviewing a new lab activity or modifying lab procedures from previous semesters. Whether or not a TA has any experience with a particular subject, they may have helpful insight into how a lab activity could be improved, particularly after having taught a given lab. If you, as the instructor, have not taught a lab section for several semesters, you may have lost sight of how a particular lab is conducted. Thus, you may be stuck in the conventional way of how a given lab was run while ignoring new and potentially more effective strategies. Therefore, it is essential to provide TAs with a platform to voice their opinions and concerns. Making a concerted effort to include TAs in the discussion will only improve everyone's learning and teaching environment.

Co-Teaching

Many of the same principles discussed above apply to co-teaching with faculty members or TAs. Some examples include attending the co-teacher's lab or lecture and maintaining effective communication regarding co-teacher roles, responsibilities, and expectations. It is generally best practice to stay engaged and attentive while your fellow TA or faculty member is teaching lab or lecture. In some cases, co-teaching may be a viable option. For example, in the soils lab course at VT, we had one of our undergraduate TAs, who are less experienced, co-teach with a more experienced graduate TA. During the first one or two labs, the undergraduate TA simply assisted the other TA to see how the lab is run before taking on any active teaching roles. The graduate TA guided, mentored, and offered suggestions for how and where the undergraduate TA could be useful. Depending on the undergraduate TA's level of experience, the laboratory instruction may be split in half; that is, one TA may discuss some of the material (e.g., more technical), while the other TA covers the remaining material (e.g., less technical). During co-teaching, it is essential to keep the flow of the instruction logical, organized, and clear for students. Thus, it might be helpful to briefly overview "who will teach what and when" at the start of the

lab. Also, if there is more than one lab activity, the co-teaching tasks may be split up between different activities (instead of both teachers covering one topic) to give students appropriate time to adjust to different teaching styles and personalities. Co-teaching may involve many other scenarios, such as co-teaching with two faculty members in a lecture-style classroom. As one might expect, co-teaching includes both pros and cons related to classroom size, instructor personality, experience level, background, conflict management styles, and so forth. Before setting up a co-taught classroom, there are several considerations to take into account. Co-teaching has several advantages in lab-based hands-on courses since students benefit from greater one-on-one guidance and support. Based on our experiences co-teaching with both undergraduate and graduate TAs, we created a list of benefits and considerations that should be addressed before co-teaching with other TAs (Table 8.3). We recommend exploring Cook and Friend (1995), which is an article covering many key topics related to co-teaching.

Table 8.3 The benefits and considerations of co-teaching a laboratory course.

Benefits	Considerations
<ul style="list-style-type: none"> • Allows a less-experienced instructor to “shadow” and observe a more experienced instructor. • Provides an opportunity for professional development and reinforcement of knowledge for an undergraduate TA. • Allows for students to receive help and instruction from an additional instructor with different perspectives and teaching styles. • Increased one-on-one assistance is especially helpful with “hands-on” activities in lab settings. 	<ul style="list-style-type: none"> • Requires extra “set-up” time on the part of the primary instructor or TA (e.g., time spent meeting with the co-teacher). • Requires clear organization, communication, and respect between instructors. • Inefficient use of lab space with two instructors. • Student may have negative perceptions of lab activities with two instructors present in the room (i.e., feeling overwhelmed or pressured to perform).

Conclusions

Laboratory courses require a combination of teaching strategies and generally take more preparation and time-management skills. Additionally, since lab-based courses usually involve multiple TAs and may include both a lecture and lab component within the course, it is essential to keep expectations clear among the instructional team and student-teacher. Maintaining effective communication between TAs and instructors should help create a well-functioning laboratory and an enjoyable working environment. Students who take lab-based courses may not be accustomed to the hands-on nature and group-learning format of lab classes. It is the responsibility of the TA or instructor to be prepared for every lab, help students stay engaged with the learning content, and facilitate discussions regarding the importance of each topic. Perhaps the best way to succeed in a lab course as an educator is to stay prepared and organized, which will in turn increase confidence. Proper lab planning and preparation, as described in this chapter, will allow the lab field trip, activity, or procedure to run smoothly and create a meaningful learning environment for most students. To effectively oversee a lab course as the lead instructor, it is necessary to provide clear instructions and expectations for your TAs. The teaching expectations in lab-based courses go beyond what is expected from a traditional lecture-style course. Even the seemingly smallest efforts, such as creating detailed TA guides for each lab and having a weekly coordination meeting, can have a positive impact on TA performance.

Reflection Questions

- Will you be teaching a laboratory, field, or combination course? What strategies will you use to motivate and inspire students aside from the hands-on nature of the course?
- What are some challenges you have faced or think you might face working with a an instructional team (e.g., professor, TAs) or co-teaching with another instructor? Reflect on your experiences and consider some possible scenarios given your unique teaching appointment.
- Describe some ways that you might positively improve your work conditions in a lab room or field setting and manage conflict if and when it arises.
- Have you considered the benefits of co-teaching in your courses? What about the use of open educational resources or digital learning platforms? Consider alternative ways to enhance the student learning environment.

Table 8.4 Example Undergraduate TA Position Description

Position Title:	Undergraduate Teaching Assistant for Soils Lab
Job Description:	<p>This is a unique opportunity for teaching and leadership experience in Soil Science. The undergraduate teaching assistant (TA) role will include shadowing the Lab Coordinator and helping with lab set-up, clean-up, and instructing. Applicants must be available on Monday mornings for lab preparation and on Tuesday mornings to attend the lab. Specific times for clean-up and set-up are flexible.</p> <p>Description of specific duties:</p> <ul style="list-style-type: none">• Independent clean-up work, such as washing lab dishes, grinding soil, and general cleaning.• Instructing students on background information for lab• Instructing students on lab procedures• Assisting students during lab activities• Answering student questions during office hours or optional study session <p>The undergraduate TA may lead 2 or more labs if they have background knowledge (e.g., Soil Chemical Properties lab if the student has taken Environmental Soil Chemistry course, Soil Profiles and Description lab if the student has been involved with Soil Judging, etc.). The undergraduate TA will teach under the Lab Coordinator/Lead Graduate TA, who is responsible for grading assignments and will lead most lab sessions.</p> <p>The position may be paid, up to 10hrs/week depending on available funding.</p>
Qualifications:	<ul style="list-style-type: none">• Junior or Senior standing• Crop and Soil Sciences (CSS), Environmental Science (ENSC) major preferred. Applications with similar major/minor (e.g., Biological Systems Engineering) will be accepted if appropriate coursework has been completed.• Must have taken Soils and Soils Lab (CSES 3114, 3124) and at least one of the following: Wetland Soils and Mitigation, Soil Genesis and Classification, Reclamation of Drastically Disturbed Lands, Environmental Soil Chemistry, Geomorphology, Soil Fertility and Management• Comfortable speaking in front of groups• Ability to explain soil science concepts to peers
How to Apply:	<p>Send resume and short statement of interest to:</p> <p>[Department Student Support Coordinate or Course Instructor]</p>
Contact for questions and more information:	<p>Course Instructor</p> <p>Lab Coordinator/Lead Graduate TA</p>

Example Grading Key

Text in *orange* represents the answer guide and point deduction.

Notebook 4: Field Trip #1 – Soil Profiles and Parent Materials

Total Possible Points: 20

(10 total; 5 pts. each) **Profile Descriptions**

Profile description sheets for the two FT1 soils are on the following pages. Fill these out and save them for the final report.

(10) **Summary Questions**

1. What is the main soil forming factor that is different between the two soils (Brush Mtn. and TRC)?

Parent material rock type (but not soil type, both are residuum). Brush Mountain is sandstone (soil pit 1), TRC is limestone (soil pit 2).

3 points total:

-2 points if parent material and rock type (e.g., sandstone) is not the answer given.

-1 point if 'parent material' alone is given without rock type.

2. How does this soil forming factor influence the soil morphological properties and land use management of the two soils? Compare and contrast for each soil.

Soil Pit 1: yellowish brown, shallow, sandy, Bw horizon. The sandstone is not easily weatherable; thus, shallow to bedrock which affects conventional septic systems. Steep slopes and sandier, less fertile soils make forestry the best land use option. Soil Pit 2: reddish brown, deep, clayey, Bt horizon. Less restrictions. Deeper soil and higher clay content makes this a better agricultural soil. The gentle sloping landscape is easier to develop.

4 points total. 2 points per soil for key morphological properties (depth, texture) and land use.

-1 point if overall depth or texture is incorrect or not mentioned.

-1 point if land use is incorrect or not mentioned.

3. Explain how the climate differs at the two soil locations.

Brush mountain is on the top of a mountain, TRC is in the valley. Brush Mountain is a few degrees colder than the TRC. Brush Mountain is also north facing, which would be colder than the SW aspect at TRC.

3 points total:

-1 point if no thorough explanation (i.e., just 'Brush Mtn is colder').

-3 points if no answer or given answer is not climate related.

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VIGNETTE: Use of Personal Response System in Classrooms

SIHUI MA

Years of research on neuroscience and the scholarship of teaching and learning have provided solid evidence that students get knowledge through active learning (National Research Council, 2000). Instead of pouring knowledge into students' heads (passive learning), active learning requires students to construct understanding rather than purely receiving. Often, active learning provides students a richer experience than listening to lectures that likely involve elaborative encoding and experiential memory (Brown, 2014). Personal response systems—from traditional handheld iClickers to smartphone-based applications such as TopHat to the polling function of Zoom for virtual classrooms—is one practical tool that can allow teachers to implement active learning in the classroom (Silberman, 1996).

In addition to active learning and student engagement, personal response systems provide instant evidence of student learning. It is well-established that we learn from practice and feedback (Schmidt, 2019). By giving frequent evaluations about student performance, we help our students learn through guidance on future effort. However, if the feedback is not provided early on, it is less effective at helping students stay on track after multiple attempts. The use of a personal response system in the classroom can prompt feedback on student learning that can be incorporated in subsequent teaching and learning.

How to cite this vignette:

Ma, S. 2022. Use of Personal Response System in Classrooms. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

Before investing in personal response systems, teachers often consider the following questions: (1) Which one should I choose, handheld or smartphone-based? (2) How much does it cost? (3) Does it improve the academic performance of students? (4) Do students like it? (5) Is it a distraction to students? The research findings on using a smartphone-based application (TopHat) in an undergraduate Food Science class may provide you some insights into the above questions (S. Ma, Steger, Doolittle, & Stewart, 2018; Sihui Ma et al., 2020). TopHat is an application that students install on their smartphones. Using the Polls and Quizzes function, teachers can ask fourteen different types of questions to assess student learning. In this class, TopHat was used to break down each of the 50-min lectures into three shorter episodes.

We chose the smartphone-based personal response systems over the traditional handheld ones for several reasons.

1. For student learning, this application allows for the ability to use questions other than simply true/false or multiple-choice—for example, circling the wine production region on a map.
2. Additionally, we were curious if we can turn smartphones into an instructional tool for both teaching and learning. We cannot deny that we bring our smartphones everywhere, and use them frequently, including attending classes via their device (Tindell & Bohlander, 2012). On the other hand, we cannot deny the evidence that multitasking, such as listening to lectures while using smartphones, is detrimental to student learning and performance (Schmidt, 2020). These significant problems bring us the golden opportunity to teach our students to use their smartphones to help them learn effectively.
3. This is a new area of research that we want to explore and eventually contribute our findings to the scholarship of teaching and learning.

The cost of using TopHat is problematic. The Pro version of TopHat is free for teachers, but students may need to pay. The basic version of TopHat is free to students, but it only comes with the polling feature; the quiz feature is not included. So if you would like to assign points to the questions that are implemented using TopHat and include the points in your grade book, students will need to purchase the Pro version, which (as of this writing) is \$30 per student for four months, or \$48 per student for 12 months. The cost is more justifiable if students use TopHat in multiple classes for multiple

terms or if the institution purchases a campus-wide subscription (TopHat, 2021). Another cost-saving approach is to ask the teaching and learning center on campus if they are willing to cover the cost through teaching enhancement grants, but this method may not be sustainable.

We found that using TopHat in lectures improved student performance in the Wines and Vines class. Student performance was measured using the scores on quizzes. Students performed better on quizzes covering content in which TopHat was used in the lectures than for content in which TopHat was not used in the lectures. However, this effect was only observed on questions that assess lower levels of thinking (Remembering, Understanding, and Applying) as defined by Bloom's Taxonomy, not those that assess higher levels of thinking (Analyzing, Evaluating, and Creating). In other words, if you are teaching a lower-level undergraduate class in which most of the learning objectives involve lower cognitive thinking, using TopHat in the lectures is likely to help the student learn and perform better.

We used a survey at the end of each semester to collect student perceptions of the use of TopHat. Students believed that the use of TopHat improved their learning, encouraged more higher-level thinking during class, and improved their focus on the course. They also considered TopHat easy and straightforward to use. However, we do not know if students would still like to use TopHat if they had to pay for it.

We also gathered information from the survey results about whether students think they are distracted by using their smartphones to answer TopHat questions. Although the self-reported data show that students feel using TopHat did not divert their attention from the course, our observations tell us that students are likely to use their smartphones for non-instructional purposes after finishing TopHat questions. Further, the instructors observed that the use of smartphones caused a multitasking distraction that lasted at least 5 minutes following the TopHat questions. Students may be confident in their multitasking capabilities and may not believe multitasking negatively affects their learning. Substantial evidence gathered from research demonstrates negative consequences from distracted learning (Schmidt, 2020). However, students will not change their behaviors or stop using their smartphones for non-instructional purposes during class if they do not believe multitasking interrupts their learning (May & Elder, 2018). Teachers can help students understand the negative impact of distracted learning by demonstrating it in class activities (Schmidt, 2020).

Overall, the use of smartphone-based personal response systems during lectures can improve student academic performance, and students reported that they like to use them if they are free. However, smartphone use for instructional purposes may introduce a distraction to the classroom—that is, multitasking by using the smartphones for non-instructional purposes while learning. Teachers need to strategically incorporate smartphone-based personal response systems to serve their purpose of facilitating learning and avoiding the negative impact of distraction.

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9. Teaching, Training, and Mentoring Students in Research Practices Inside and Outside the Classroom

ANNE M. BROWN

Introduction

Graduate students and faculty often engage in supporting, training, teaching, and mentoring undergraduate researchers in order to achieve research project milestones and to contribute to university experiential learning initiatives, much as you may be doing now. However, as you may have found, little training or guidance exists on how to successfully engage and train students in the research environment of an R1 university setting. Undergraduate research is identified by the Association of American Colleges and Universities (AAC&U) as a high-impact practice (HIP) (AAC&U, 2020). These undergraduate research experiences can be very valuable in enhancing workforce development skills for undergraduates, but lack of planning, project scope, training, acknowledgment of skill level, and consideration for how to best train and teach students can be challenges for both graduate students and faculty. This chapter outlines an organizational teaching structure that can be used to engage students in undergraduate

How to cite this book chapter:

Brown, A.M. 2022. Teaching, Training, and Mentoring Students in Research Practices Inside and Outside the Classroom. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

research in a traditional (e.g., classroom) and a non-traditional (e.g., research lab) environment. Additionally, this chapter offers best practices to ensure a successful experience in teaching, training, and mentoring undergraduate research students in a research-intensive university setting.

This chapter will discuss...

- Strategies for structuring research experiences in a classroom or lab environment.
- Practices to incorporate in the mentorship of students in undergraduate research

Background

The role of experiential learning in higher education is expanding as new initiatives and strategic plans incorporate and support the practice in the undergraduate career of all students (Eyler, 2009). Pioneered by David Kolb in the 1980s, experiential learning can be cyclic and moves students from “concrete experiences” to “active experimentation/application”, with reflection and conceptualization components integrated into the cycle (Kolb, 1984). As a collective whole in higher education, “experiential learning” is frequently used synonymously with the term “experiential education.” Experiential *education* is often viewed as the broader philosophy of the complete educational pathway of a student, whereas experiential *learning* applies to an individual learning experience. This experiential learning process benefits students by grounding the theoretical core domain knowledge in an applied setting, where it harnesses the creativity of students to promote deeper levels of critical thinking, and it can incorporate

a “trial-by-error” level of confidence and engagement with the material (Kolb & Kolb, 2018). Experiential learning can take many forms, including field work, internships, service-learning, and, in the context of this chapter, undergraduate research.

Undergraduate research experiences (UREs) can be a pivotal experience for students, regardless of major and anticipated career routes (NASEM, 2019). Undergraduate research is considered one of the high-impact practices (HIPs) defined by the Association of American Colleges and Universities (AAC&U) and can benefit students by its integration in a classroom setting or in an applied learning setting (e.g., in a lab, in the field, etc.) (AAC&U, 2020). Often, undergraduate research is not a well-understood activity for undergraduate students in their first and second year, especially at a research-intensive (R1) university. Students often hear about undergraduate research opportunities, but are rarely exposed to what that represents for both the institution and for them in their own personal career journeys. As faculty members in the university, we can fill this knowledge gap by improving the communication systems to emphasize the utility and impact of undergraduate research, alongside training in research and data literacy, on our students’ durable skills.

Research as a broad conceptualization can engage students in thinking about questions they have about the world or an area of personal topic interest, promote a route for them to explore these questions, and ultimately collect necessary information (data!) to make decisions. Students develop a variety of skills such as information management, data management, data ethics, and problem solving during a URE. Importantly, students can leverage these UREs in their future careers—the major skills of critical thinking/problem solving, communication (oral, written, digital), and teamwork/collaboration that are developed during a URE influence the abilities of individuals in every sector of the workforce (McClure-Brenchley et al., 2020). Conveying the broad skillsets learned in an URE, in addition to the domain-specific technical aspects, can be incredibly useful in promoting these experiences for students and often enhance engagement as well (Brown et al., 2016). Describing these topics to the students as both skills learned and marketable features as they enter the next steps of their careers can further clarify the role of the university research enterprise to students.

As faculty members and graduate students, we can recognize the importance of UREs for undergraduates, but how do we creatively, strategically, and equitably engage students in these skills without

overtaxing our own capacities? We must structure an unstructured experience, frame skill development, and focus on both research theory and domain specific training to provide an exceptional experience for students and the instructors (Brown et al., 2016). This chapter will discuss these practices in the classroom and in the research lab, where each setting has different goals and outcomes, but can benefit from commonalities in approach to engaging students in research.

Teaching and Mentoring Students in Research in the Classroom

Course-based undergraduate research experiences (CUREs) are becoming increasingly more common as a means to consistently engage a larger group of students in active-learning of research skills (Bangera & Brownell, 2014; Dolan, 2016). CUREs can be framed as a repeated, tested implementation or a certain research methodology that still maintains authentic inquiry by the student or as a research project related to the research interests of the instructor. Specifically for the latter example, individuals have implemented CUREs in a biology curriculum to have multiple student groups participate in a stepwise test of mutations of certain protein structures, using the student human power as a means to more widely scan for impact of mutation. Regardless of the intention and implementation, students are able to participate in this experience for course credit, easily integrate the experience into their schedule, and in some cases get required course credit for degree completion.

CUREs are not without challenges. For example, the time to instruct or serve as a teaching assistant (TA) in a CURE is much more time intensive than other courses, such that students often have issues in motivation and ownership of projects, and TAs lack the expertise to mentor students in a CURE environment (Heim & Holt, 2019). Having implemented a CURE for a first-year, 1 credit, P/F environment in the field of biochemistry, personal experience indicates these challenges are justified.

There are some strategies that have aided in the mitigation and improved experience (of both the instructor and the TA):

1. **Outline requirements up front.** On the first day of class, we provide the rubrics, instructions, and expectations for the final deliverables of the CURE. Students are grouped either naturally at the start of class (using a SCALE-UP classroom, students naturally join tables) or in virtual teaching—via randomized assignment to smaller “breakout rooms” wherein small groups of students can synchronously collaborate until allocated group time ends. Students remain in these groups for the entire semester. Originally, we did not define group roles (i.e., everybody had an equal role). However, in more recent iterations of the course each person/group fills a specific role (project manager, lead data collection, lead writer, lead presentation design, etc.) so that there are more tangible responsibilities up front and students can conceptualize the process throughout the entire semester on the first day. Second, framing the project in terms of specific roles helped students properly conceptualize the complexity of collaborative research. As instructors, we also created all sign-up sheets for these roles (via Google Sheets) and shared notes documents (via Google Docs) and have these linked on the homepage of the course learning management system (LMS). These specific tools were chosen because they had the lowest barriers to access, requiring only a browser and limited processing power. The clarity of expectations and routes to move forward have improved student engagement and diminished confusion.
2. **Explicitly discuss the impact on their skills and careers.** In the first-day materials, there is an explicit slide that details the skills to be taught and the objectives that will be experienced/performed by the student. These include basic research and data literacy skills (file management, file naming, data ethics, consumption of credible information, teamwork, writing and presentation skills) and domain specific, technical skills (for our course – command line interface, bash scripting, molecular visualization, summary statistics, etc.). After polling the class for general career interests, we then use at least one of those skills as an example in a career case the student might encounter. While the actual topic of the CURE implemented in the course might not be a direct interest of the student, the students can now

conceptualize how this process can be beneficial for them. This has helped with the issues of ownership and follow-through of students.

3. **Offer incentives.** While not possible in all situations, many universities offer an end-of-semester research symposium. Students have indicated that a final poster presentation that is attended by non-class faculty and students is an incentive. Additionally, students can add this presentation and/or symposium to their resume. Participating in a symposium hosted outside of the class might be extra work for a graduate teaching assistant (GTA) or instructor, so other opportunities include inviting faculty of the discipline to attend an in-class digital poster session (using screens in a large classroom or meeting room) at the end of the year. This then creates networking opportunities, which is a big attraction for students. Additionally, some of the research training modules in the course (e.g., data management, data ethics, etc.) have all been designed to be a digital credential (sometimes referred to as badge) so students will have records of completion as they explore internships or other on-campus research opportunities.
4. **Don't forget to be a mentor.** We have all struggled in the process of research in a variety of ways. Convey that to your students and humanize yourself and the process of research. Sometimes we focus solely on completing the in-class activities of the day and reaching the final deliverables of a course. With a CURE, however, there will be down time for the instructor to be circulating the room. One strategy that was very helpful was making sure each group had a regular check-in. How was their project going? What questions did they have? Did they know why they were doing today's task? Finally, and what might be most important, how were they doing in general? How was their semester going? Were they excited about something coming up? Those questions greatly influenced the collegiality of the course and made the entire class, not just an individual group, feel like a team. These questions additionally opened the door for students to ask the questions they might be hesitant to ask out of lack of confidence, and even comment "I learned about things I didn't know I needed to learn about."

These four strategies have been helpful in finding balance and having clear expectations for both the student and instructor during a CURE. For a GTA, it can be useful to have all of the planning and expectations of the student

deliverables completed at the start of the semester so that both the student and GTA know the final goal. Instructing or acting as a TA for a course that includes a CURE can be a rewarding experience and will be quite different from a lecture experience. Working with students in this capacity can also be a fantastic experience for GTAs earlier in their career, as mentoring students in the completion of a research task can develop their own mentorship and research skills.

Teaching and Mentoring Students in Research in the Lab

More structured undergraduate research experiences in the lab setting can be beneficial in supporting inclusivity and STEM retention (NASEM, 2019; Hernandez et al., 2018). While it might seem oxymoronic since undergraduate research is about exploration and discovery, students need structure when learning many of the technical and procedural aspects of undergraduate research. Students are accustomed to being in a defined learning environment and classroom. Expectations are highlighted on the first day and there is a pretty standard procedure of events. However, often it is solely up to the principal investigator (PI) to determine how a research experience is structured. This structure varies greatly even among instructors within the same department. While that freedom for the PI is warranted, we need to consider how that can affect the student and the GRA (graduate research assistant) that might become the central point of contact with the student. Implementing structure and training in both domain specific techniques and research methodology is necessary in order to provide a comprehensive training and experience for undergraduate research students and best utilize graduate student and faculty time and resources. Structuring the “standard” parts of the research process, like end of semester goals and deliverables, highlighting the timetable in which certain major milestones should be reached (which should not be tied to actual research results obtained), developing a grading/accountability scale, and presenting expectations in a way that students are used to will alleviate a lot of repetitive questions and provide a sandbox for the student to develop. This structured approach has been studied (Brown, Lewis, & Bevan, 2016) by

examining the pre- and post-implementation of a structured undergraduate research experience, and the value and utilization of a structure in undergraduate research experiences, and highlights the impact of continuous iterations and lessons learned implemented since deployment. Tips for implementing structure but allowing sandbox creativity are as follows:

1. **Use a syllabus.** While it might seem confining or unnecessary to have a syllabus for a URE, most students are receiving credit for their time in the research lab. This credit is counted equally to any other course credit they receive, so why not have the same standardization that students are used to? We have found that having a syllabus greatly streamlines the process and semester expectations that already exist in other UREs as well as in other courses (e.g., paper, weekly participation, documentation, etc.) and defines expectations in a way that makes clear the grade the students will receive for credit. This has greatly enhanced our ability to host more undergraduate research students and has provided equitable settings for all students—from those starting in their first semester to those that have been in the lab for years. While the syllabus is a useful tool for setting student expectations, it is also highly valuable for the instructor and GRA. There are times when students might vanish, becoming unresponsive to emails and not heard from again. Perhaps the student is overwhelmed, overcommitted, or other issues have arisen; it therefore becomes more difficult for the instructor to assign a grade if there is no track-record of accountability and no route to prove that assignment of the given grade was warranted. This can also ease the stress of a GRA who has a student who is not showing up and provides easy documentation to show the PI the issues occurring without feeling responsible for them.
2. **Create structured training protocols.** Students starting in the research lab will likely have minimal training both in the concepts of the research process and in the specific techniques utilized in the research group. Therefore we have found it useful to implement a standardized training process that all students must complete regardless of skill level. This provides equitable scaffolding for all students to join the group and requires output of the student so skill level and interest in research can be assessed and students can be more appropriately matched to projects based on these skills and interests. While some

labs might not be able to afford that level or time commitment of training, it has paid off in the outputs after the first semester.

3. **Use an online platform for protocols and training.** All aforementioned training is hosted on an LMS, which makes new students joining the group much easier to handle once the initial time investment in module/training material creation has occurred. Having all tutorials for the specific lab and training in one place, be it be on an LMS, an Open Science Framework, or an internal website, the central location and focus of a purposeful training can ease the burden of students integrating into the lab and developing the skills need to work on research projects.
4. **Implement several indicators of “success.”** Often, GRAs or PIs expect students will produce stellar research results right out of the gate. In reality, this will not often be the case. Developing the skills to revise and re-do experiments in order to grow is a core component of the research process and it is our responsibility to develop the acceptance of and need for iteration in students. It is important for students to experience that the first time we do something, especially in research, it will often not result in a final product. Iteration and the normalness of this process of improvement needs to be both communicated and embraced. The little wins—the connection of two pieces of information, forward movement even if small, or having a good student discussion—need to be acknowledged. PIs should be gracious with their GRAs and praise their overall interaction and work with a student, especially when the student grasps a difficult topic or continually improves at their presentations in group meetings. Looking at the process holistically, not solely based on the research outputs, will improve morale and motivation in the undergraduate research student and the team as a whole. There are occasions when GRAs may become stressed that it will reflect poorly on them as the GRA that a student is not performing—and you should remind them of the overall goals and various measures of success. We are all in different places in our life and we must be kind and observant of this with our students. We are here to perform high-quality research and to mentor the next generation in research and data literacy, and prepare them for their next steps in their careers. This approach and attitude can greatly improve team morale, relieve stress, and indirectly, improve the research outputs.

Imposing a structured framework on the research process a student partakes in during a lab-based URE can benefit the student, GRA, and instructor. The general structure, grading scheme, expectations, and routes to find information related to the URE should be easy to access and find (e.g., one central location). Standardization across all students enhances community and can help with students lacking confidence in an URE.. Openly and easily accessible trainings (e.g., publicly available and easy to find) and protocols can improve the transparency of research performed as well as teach best practices for both open research and open science. While there is some up-front time required to create the structure—specifically the syllabus and training materials—that time is recouped in the future with a system that makes it easy to bring new students on board. In the end, this structure and planning contributes to both the research *and* teaching enterprises of the university.

Lessons Learned from Teaching and Mentoring Students in Undergraduate Research

UREs are a fantastic experience that allow students to engage more deeply in a topic, experience success and failure in safe environments, and propel their curiosity and skills to the next level (Petrella & Jung, 2008). That is not to say that these experiences are not time-consuming for instructors and GRA/GTAs, but the interactions, excitement, and outcomes that result can greatly outweigh the challenges. This chapter has highlighted the importance and role of experiential learning, specifically undergraduate research, in the education and development of the student in multiple settings. Routes and advice to deal with challenges of UREs in both the classroom environment and in the research lab setting are discussed, as well as highlighting the commonalities between them. Preparing and thinking about the kind of environment and setting you want to create in an URE is an important starting place. As instructors, we must continually consider how we frame and present to students the process of research, enhance their data literacy, and introduce domain-specific techniques and knowledge. Given the proliferation of misinformation, how we approach research and data literacy training via UREs is critical.

In retrospect as an instructor/PI in who both teaches an URE in a course and leads a large undergraduate research lab, these roles as a research instructor and research mentor are one of the most important, if not the most important, aspect of my position at the university. Mentorship has the ability to propagate long-lasting, far-reaching effects. The excitement that we demonstrate and the environment that we create in class and in the research lab has an ability to etch into the life experience of the student given the nature of UREs. UREs provide us the chance to be a mentor for both our students and our GRAs/GTAs. I have had and currently have exceptional mentors and I challenge myself to give back in the same way that I have benefited, propagating that cycle further. Just like framing of benefits is discussed in how to work with challenges of CUREs, it is important to conceptualize how important being a good mentor is at the onset of working with students in UREs.

A piece of advice when conceptualizing mentorship in UREs: one cannot “blanket mentor.” That is, each student needs an individualized approach to their particular mentoring relationship. Start those conversations early, and know that while it is a time investment, it benefits both the mentee and the mentor in the long run. Mentorship is a learning process, and I encourage you to follow Slack channels, Twitter threads, and scholarship on the matter for advice and solutions. As academics, we all are continually refining our craft. Participate and challenge yourself in these mentorship conversations as well as in your approach to deploying UREs in the classroom and lab environments. The tips and techniques discussed in this chapter will hopefully improve your experience in engaging with students in research environments. If you are a GRA/GTA beginning your journey in mentoring undergraduates, do not hesitate to ask your PI/instructor/mentor questions about these topics and challenge yourselves to grow in this area; it will benefit you throughout your career, no matter the path you take.

Reflection Questions

- What is one technique that was discussed that can be implemented in an undergraduate research experience that you work with?
- What is a technique or strategy that you have implemented that might mirror those discussed here? Have they been successful in alleviating challenging experiences in the classroom or the lab?
- Have you thought reflectively about your current and past mentorship of students? What is working or not working and how might you adjust?
- As a GRA/GTA working with students in an URE, what is something you will utilize from this chapter in your current class or research lab?

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VIGNETTE: Lessons Learned as a First-Time Experiential Learning Program Instructor

CAITLIN CRIDLAND

Introduction

As a teaching assistant and Graduate Teaching Scholar for a summer experiential learning program, I have had a very different experience than many other TAs. The program I was involved in provided undergraduate students with hands-on basic and applied plant and food science research experiences. In addition to research experiences, scientific workshops are held throughout the summer to enhance student engagement with agricultural and food security techniques and issues, as are professional development workshops to help students navigate research labs and academia. During my last year as a Graduate Teaching Scholar, we were forced to pivot our usually in-person program online and provide a novel research experience virtually during a global pandemic. For those of you who are in similar positions working with an experiential learning program or course, or looking to include an experiential learning piece in your course, I hope this reflection on three lessons I learned can help you in your teaching journey.

How to cite this vignette:

Cridland, C. 2022. Lessons Learned as a First-Time Experiential Learning Program Instructor. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

I. Provide Clear Structure and Expectations from the Outset

With the changing schedules of online, hybrid, and in-person teaching that 2020 and 2021 brought, setting clear expectations and objectives for students was paramount for success. When designing the syllabus, create a consistent schedule, with recitations or report writing sessions spaced predictably throughout the semester. Schedule consistent deadlines and due dates for similar assignments or exams. For example, homework is always due on Fridays before class or exams are always on Thursdays. This structure helps keep the students on top of their deadlines in the class. Additionally, it helps you stay on top of grading, lesson planning, and assignment writing.

In addition to creating structure within the course, set clear expectations for the different sessions/lab periods and the materials students are expected to bring with them to class. If your experiential learning course contains a recitation portion where students don't need to bring personal protective equipment (PPE) but do need laptops or textbooks, communicate these expectations early on to avoid confusion. If your experiential learning course is online and students are running experiments from home, set expectations early about how you will check in with their experimental setup and data collection. For example, will you require students to share their experimental setup in real-time over Zoom, or is sharing a prerecorded video or photo sufficient? Setting these expectations early also provides time for you to help students access institutional resources if needed—for example, renting a laptop, iPad, or camera from the library. Similarly discuss expectations and etiquette that you will follow when using video conferencing. For example, do you prefer your students to have their video on the entire time? Do you mind if pets walk in and out of the background? Discussing your expectations, and also your students' expectations, is important in this new environment. It is important to note here that with the pandemic, our schedules and responsibilities have changed, and expecting a pristine background, quiet kids and pets, and top-speed internet the entire time is unreasonable. Additionally, provide resources on how to use the video conferencing software or application to help your students with the transition to online meetings.

2. Be Flexible

Just like in research, obstacles and delays are bound to occur in experiential learning. When I first started working with the program, I thought changing the schedule because of unavoidable delays or unexpected results would result in me looking disorganized and unprofessional. However, the longer I worked in research and teaching, the more I realized that adaptability and flexibility were key skills that students needed to learn. In addition to teaching students how to plan experiments and analyze data, we also need to teach students how to troubleshoot and adapt when experiments don't go as planned. During my last summer with the experiential learning program, we had delays because the plants that students were growing weren't growing as fast as they do in the lab. Instead of being worried (and also worrying the students) about how this delay would impact the schedule, we took the time to discuss their growing conditions and how different factors impact plant growth. By looking at other phenotypes the plants were displaying, we figured out that the lighting intensity for the at-home experiments was lower than in a lab setting, and discussed how this lower light could be impacting other phenotypes they were seeing in their experiments. From this experience, students came out with a better understanding of how abiotic factors impact plant growth, and how they could improve their experimental setup if they were to repeat the experiment. I encourage you to use problems that arise from students' experiments as learning opportunities and still gather as much data from "failed" experiments as possible. Students will come out of your course with enhanced troubleshooting and critical thinking skills, which are important for researchers.

Whether or not your course or program is in-person, virtual, or hybrid, your students may still be feeling the impacts of the pandemic. Changing responsibilities, online schooling, and reduced childcare access due to COVID-19 can all contribute to additional stress. Acknowledge the constantly changing current environment and the extra bandwidth and time this can take. While this "lesson learned" may seem contradictory to the previous lesson, I believe setting deadlines and being flexible work hand-in-hand to make the students' experience in experiential learning as beneficial as possible and your experience leading experiential learning as stress-free and organized as possible.

3. Check in Frequently

Whether your experiential learning experience is in-person or online, checking in with your students frequently is a must. Checking in with students can include surveying students about the course material (e.g., *Do you feel like you understand impacts of phosphate starvation on plant growth? Would you like the instructor to spend more time going over statistical analysis in class?*), if events outside the classroom are impacting their focus or performance inside the classroom (e.g., *What concerns or worries do you have about being engaged in an online research experience compared to an in-person research experience?*), or both. Consistently checking in with students allows you to cultivate a learning environment of respect and trust. When our experiential learning program went online due to the pandemic, I queried the students before the start of the program to get an idea of the level of plant science experience they had coming in and any concerns they had for the program. While we knew we could not control all of the concerns or comments that our students raised in the survey, making an effort to address the concerns that were within our control was important to build trust and openness with our students. In addition, every week students completed a short survey that included specific questions about the week's content and space for students to leave any questions or concerns anonymously. Consistently, students asked for more lectures and tutorials on one of their projects, so we added weekly tutorials to take the students through each step of that project. If your program or course is online or even hybrid, consider making time for students to gather to work in groups or socialize. The physical distancing and lack of social interaction that virtual learning brings can lead your students, especially first-year students, to feel disconnected and lonely. Use weekly meetings as an opportunity to check in and discuss how they are really feeling. Create space, whether in current meetings or coffee hours where students can gather, chat and socialize. Encourage your students to prioritize their mental, emotional and physical health—even acknowledging current struggles and emphasizing their health as the priority can be helpful.

Conclusion

Being the instructor of record for the first time is scary, and leading an experiential learning experience with its many moving parts can be even more daunting. I hope these three lessons I learned during my first summer of teaching can help you on your teaching journey!

10. The Power of Extension: Research, Teaching, and Outreach for Broader Impacts

JEREMY ELLIOTT-ENGEL; COURTNEY CRIST; AND GORDON JONES

Introduction

The land-grant university (LGU) system was created on a foundation of three missions: classroom-teaching, research, and a specific type of community education called Extension. The majority of this book has highlighted and focused on the formal higher-education classroom-teaching experience of the mission, and your doctoral program has provided training on the research component. This chapter will focus on the third mission, Extension (at non-LGU institutions similar efforts may be called outreach, engagement, or service). The Cooperative Extension System (CES) has a mission to translate research-based findings, best practices, and information in four broad program areas: youth development (4-H), agriculture and natural resources (ANR), family and consumer sciences (FCS), and community development (Seevers et al., 2007). Land-grant universities employ Extension educators to work from campus and state regional centers, as well as in local county or city offices to deliver Extension education programs based on stakeholder needs—including state, industry, and community needs

How to cite this book chapter:

Elliott-Engel, J., Crist, C., and James, G. 2022. The Power of Extension: Research, Teaching, and Outreach for Broader Impacts. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

(Baughman et al., 2012). It should be noted that university and state Extension organizational structures and program priority areas differ by state.

Extension educators offer nonformal educational programs to both businesses and the citizens of their communities. Local Extension educators are supported by research and Extension faculty across departments from the LGU. To start our journey to understanding what Extension education is, and how you, as a future or current LGU faculty member and researcher, will support Extension education, we will recount the history of the LGU mission, then introduce a learning theory for nonformal education, and finally explain the unique planning processes of Extension education programs.

The objectives of this chapter are to provide a translation of effective teaching practices from the higher-education classroom and emphasize the interconnections of teaching and research disciplines to impactful community outreach, engagement, and impact.

This chapter will discuss...

- The origin and mission of the land-grant university system.
- Educational theory utilized in non-formal educational settings.
- Educational learning contexts and environments outside of the formal classroom.
- How to establish and integrate a research, teaching, and outreach educational program to support broader impacts

What Is Extension?

The use of the word “Extension” derives from an educational development in England during the second half of the nineteenth century. Around 1850, discussions began in the two ancient universities of Oxford and Cambridge about how they could serve the educational needs, near to their homes, of the rapidly growing populations in the industrial, urban area. It was not until 1867 that a first practical attempt was made in what was designated “university Extension,” but the activity developed quickly to become a well-established movement before the end of the century. (Jones & Gartforth, 1997, p. 1)

The idea of Extension started in the late nineteenth century in both the United Kingdom (UK) and the United States of America (US) with three components: adult education, technology transfer, and advisory services (Shinn et al., 2009). In the United States, the development of the Extension system started on July 2, 1862, when President Abraham Lincoln signed the Morrill Land-Grant College Act (Morrill Land-Grant Act, 1862). This legislation forming the LGU system was sponsored by Vermont Senator Justin Smith Morrill. Passage of the Morrill Act was unexpected because President James Buchanan had previously vetoed a version of the act in June 1860 due to Southern state representatives’ criticisms that granting Western territorial land was an imprudent use of resources. The Western territorial lands were lands taken from Native Americans by the US government. The bill that was vetoed had granted just 2,000 acres for a university’s setup. The successful version of the Morrill Act granted 30,000 acres of Western territorial land as an endowment to establish at least one college per state and territory (Wessel & Wessel, 1982). The Morrill Act successfully passed in 1862 largely because Southern states representatives were absent from Congress at the time of the vote due to the Civil War (Lee, 1963).

The established purpose of the LGU institutions is to make liberal and practical education available to all citizens of the nation, particularly the working class (Duemer, 2007; Depauw & McNamee, 2006; Lee, 1963; Simon, 1963). To achieve this mission the Morrill Act and its successors were deliberately designed not simply to encourage, but to force the states to significantly increase their efforts on behalf of higher education. The federal government, having promoted the establishment of new colleges, made it incumbent upon the states to supply the means of future development and

expansion (Lee, 1963, p. 27). The LGUs married the humanistic idea of the renaissance university (liberal education) and the German university (practical education) (Bonnen, 1998). This combination of liberal and practical education in one institution was designed to democratize education and provide educational opportunities for all citizens. The LGUs evolved into entities with a three-pronged mission of research, teaching, and outreach (Simon, 1963).

In 1890, a second Morrill Act was passed, which prohibited the distribution of money to states that made race a consideration when making decisions about admission to their state's 1862 LGU institution (Lee & Keys, 2013). Each state had to demonstrate that race was not a criterion when considering a student's admission to the LGU. If Blacks or other persons of color were unable to be admitted because of race, then a separate LGU was established for them (Comer et al., 2006). This resulted in 19 previously slave-holding states establishing public colleges serving Blacks (Allen & Jewell, 2002; Provasnik et al., 2004; Redd, 1998; Roebuck & Murty, 1993). These "1890" institutions were awarded cash in lieu of land; however, they retain the designation of "land grant" due to the legislation. The 1890 institutions brought public and practical education to previously excluded and marginalized populations.

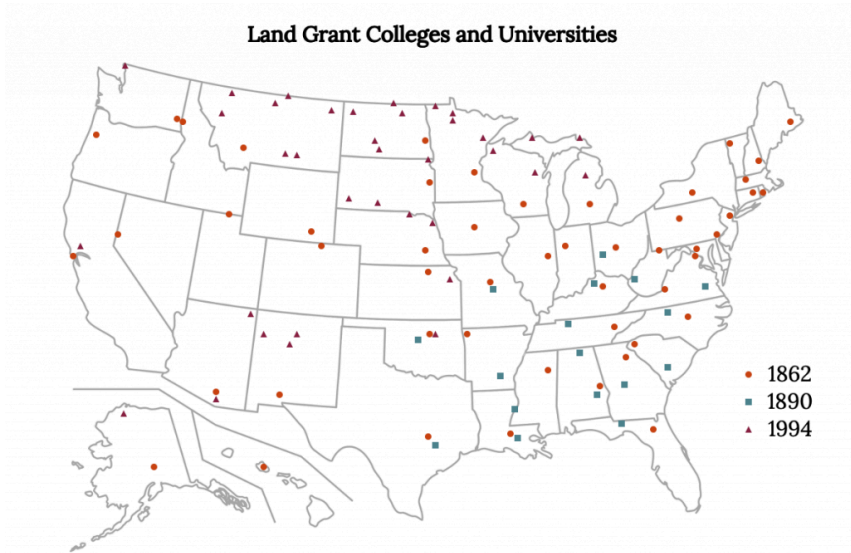


Figure 10.1 Map of the 1862, 1890, and 1994 Land Grant Colleges and Universities. University of Puerto Rico, University of the Virgin Islands, University of Guam, Northern Marianas College, College of Micronesia, and American Samoa Community College, all 1862 institutions, are not shown.

In 1994, the Equity in Educational Land-Grant Status Act established 29 tribal colleges and universities as “1994” tribal land-grant institutions. These institutions have a mission to provide federal government resources to improve the lives of Native American students through higher education (USDA-NIFA, 2015).

The three current missions of research, teaching, and outreach were achieved through additional legislation. The 1887 Hatch Experiment Station Act (Hatch Act) established the State Agricultural Experiment Station (SAES) to improve agricultural production through applied agriculture research and to provide educational outreach opportunities through the LGUs (Knoblauch et al., 1962). Joining the locally responsive research from the SAES with the LGUs expanded the capacity for classroom education and provided the opportunity to share knowledge onsite at research stations across each state. However, to extend the positive benefits of knowledge farther afield, more efforts were needed. Cooperative Extension began when President Woodrow Wilson signed the Smith-Lever Act into law on May 8, 1914. The

purpose of Extension was declared to be an effort “to aid in diffusing among the people of the U.S. useful and practical information on subjects related to agriculture and home economics, and to encourage the application of the same” (Rasmussen, 1989, p. 7). The Smith-Lever Act did not specifically state that Extension services should only work with farmers (Ilvento, 1997; Rogers, 1988). Extension was designed to take the research-based knowledge generated at the LGUs and the SAES to US citizens through a partnership between LGUs and the United States Department of Agriculture (USDA).

The implementation of this organizational system had significant and profound effects on adult education in the United States. Liberty Hyde Bailey, a renowned botanist and Cornell faculty member, was instrumental in the formation of the Extension service and 4-H; he argued that Extension could not address agricultural production issues without also addressing the social and human issues facing rural communities (Ilvento, 1997; Rosenberg, 2015). At the time, he lost the argument to Seaman Knapp, then president of Iowa Agricultural College, who laid the foundation of the Agricultural Experiment stations as an employee of the USDA. Knapp argued the role of Extension was solely to educate reluctant farmers on new technology (Ilvento, 1997; Peters, 1996). Because of Knapp’s influence, the purpose of Extension began as instruction and practical demonstration concerning agriculture and home economics for individuals in communities across the state who would otherwise not have access to information and new innovations.

The name Cooperative Extension emerged from the cost sharing, which required using state and local funding sources to match the funds contributed by the USDA. Currently, federal partners supply approximately 30 percent of the system’s financial resources, while state and local (e.g., county) funds make up the remaining portion of the budget (Rasmussen, 1989). Further, following funding trends within higher education, a growing share of Extension budgets consists of extramural grants and contracts (Jackson & Johnson, 1999).

The focus of US Extension work has evolved from primarily relaying technical innovation to also providing leadership for social, cultural, and community change and development (Stephenson, 2011) by partnering with communities to identify solutions to challenges in partnership (Vines, 2017). As previously mentioned, this adaption reflects a move toward Bailey’s perspective that community programming cannot provide technical knowledge without first supporting the individual and social needs of the

participants. Extension, because of the nature of the organization, has always engaged with communities, and more importantly, has acted as an accessible and knowledgeable resource for the communities they serve. Extension professionals have sought to respond to society and community needs, whether in response to supporting a reduction of poverty in rural communities (Rogers, 1988; Selznick, 2011) or helping the nation survive World War I, the Great Depression, and World War II (Rasmussen, 1994) by ensuring the sustainability of food resources, and by supporting rural electrification (Rosenberg, 2015), rural telephone, and today, broadband access (Whitacre, 2018). The mission of Extension has expanded from a focus on agriculture and family and consumer sciences to incorporate areas of health, community, and business development, and from solely rural audiences to rural, suburban, and urban communities (Morse, 2009; DePauw & McNamee, 2006). While work remains to be done, 1862 LGUs in every state and territory work to serve a demographically representative population and address community challenges (Elliott-Engel, 2018), and 1890 and 1994 LGUs target historically underserved populations with specific interventions.

What Is Extension Education?

Early practitioners of ... Extension education drew from foundational theories of learning and teaching (Dewey, 1938; James, 1907; Lancelot, 1944). During the early evolution, knowledge was grounded in observation and experience and passed to others through direct engagement methods. Over time, ...Extension education integrated the principles of learning and teaching, applied research, and Extension outreach. Today's field of study draws from educational psychology and the works of Bandura (1977), Bruner (1966), Gagné (1985), Knowles (1975), Piaget (1970), Thorndike (1932), Vygotsky (1978), and others. Perspectives of learning rise from the educational theories of behaviorism and constructivism, while the perspectives of teaching are drawn from the works of Freire (1972), Habermas (1988), Kolb (1984), Lewin (1951), and others who advanced problem solving, critical thinking, and communicative reason. (Shinn et al., 2009, p.77)

Extension is an organization that continuously plans, executes, and evaluates programs with learners (Meena et al., 2019, p. 17) and updates or modifies as needed. Extension education is a knowledge exchange system that engages change agents in a participatory persuasive process of educating stakeholders in a changing world (Shinn et al., 2009). Extension educators are professionals in the social, behavioral, and natural and life sciences who use sound principles of teaching and learning, and they integrate the sciences relevant for the development of human capital and for the sustainability of agriculture, food, renewable natural resources, and the environment (Shinn et al., 2009).

Extension education can be conducted and executed in many forms including in-person education (e.g., workshops, seminars, demonstrations, short courses), publication (e.g., website, print media), and using social media (e.g., infographics). In many non-LGU institutions, Extension is commonly referred to as community outreach or engagement. These terms originated in the Extension education movement. The work, when adopted, contributes to the democratic process of encouraging institutions of higher education to help extend research efforts beyond the students in the classroom and fellow researchers in academe to communities or businesses where it can be directly applied.

There are several principles that are important to keep in mind to ensure success in extending research and knowledge outside the higher education environment. The education of community members has different principles than the formal education setting. In formal education settings, motivation is incentivized by earning grades needed to receive certification through the earning of a degree. In nonformal education settings, education centers around learners' motivations to obtain the knowledge being offered and its impact on their livelihood or success.

Nonformal Education Theory

Nonformal education is the learning instruction provided beyond the traditional secondary education system designed to prepare individuals (adolescents and adults) to achieve their personal, social, and economic life goals (Okojie, 2020). When extending their research beyond the formal

classroom, the educator becomes an adult and nonformal educator, also known as an Extension educator. Extension educators remain intentional and systematic while also recognizing content can and should be adapted for different clientele (Etling, 1993).

Researchers have defined adult learners in overlapping but somewhat different ways. Merriam (2008) describes adult learners as those whose age, social roles, and self-perception define them as adults. Adult learning theory is informed by foundational scholars in related fields such as psychology and sociology. The theories of behaviorism, cognitivism, humanism, constructivism, and connectivism illuminate different learner types and their disposition toward the process of education (Balakrishnan, 2020). The main ideas, approaches, and contributions of these theories have been summarized for your reference in table 10.1. The denotation of the theory, approach, and application is indicated by the theorists' major works and forthcoming implications.

Table 10.1 Summary of the primary theories of adult and non-formal learning and behavior change.

Theorist/ Thinker	Approach/ Premise	Definition of Learning
Émile Durkheim	Sociology of Education	Education is a social process.
B. F. Skinner	Behaviorism	Demonstration of learning is a resultant change or modification in behavior, largely overt behavior.
Jean Piaget	Cognitivism	Teaching and learning results from observation, attention and personal involvement by the teacher along with practice aimed at bringing out individual capabilities.
Abraham Maslow	Humanistic	Human capacity for choice and growth, and inner emotions is needed to effectively learn. Maslow linked readiness to learn to Maslow's hierarchy of needs. Rogers argued learning needs to be student-centered and personalized.
Carl Rogers		
Jean Piaget	Constructivism	Learning is facilitated by providing an environment that promotes discovery and assimilation/accommodation.
Lev Vygotsky	Social Constructivism	Collaborative learning occurs in the presence of facilitation and guidance. Group work is encouraged.
George Siemens	Connectivism	Behaviorism, cognitivism, and constructivism are used together. Learning is about knowledge distribution across an information network, storage, connectivity and new forms of learning communities.
David Kolb	Experiential Learning	Abstract concepts are easier to comprehend based on practice.
Vincent Tinto	Interactionalist	Persistence and departure from learning programs is a result of individual and environmental factors.
Alexander Astin	(Student) Involvement	Change and development is an output of curricular and cocurricular factors.

John Bean & Barbara Metzner	Persistence (model)	Nontraditional students have specific requirements for retention, attrition, and persistence.
Malcolm S. Knowles	Andragogy	Adults need autonomy and self-directedness in learning programs.
Albert Bandura	Social Learning	Learning is from peers through methods like observation, modeling, and imitation.
Everett Rogers	Adoption of Innovation	Learning is represented by adoption (use) of new technology and innovation.

Each theorist presents a systematic explanation for the observed facts and laws that relate to a specific aspect of life (Williamson, 2002), in this case the nonformal learner. Each of the theorists allows the Extension educator to conceptualize the learner in different ways. The nonformal learners bring their lived experiences, and thus, their varied motivations to the educational process. The educator in the nonformal context must think about barriers to participation and adoption (Rogers, 2003) of the practice or materials presented.

Nonformal Education Is Present Everywhere

The nonformal educator views all contexts and environments as a possible classroom and everyone as a possible student. The educator working with or through Extension (Extension Educator) has the flexibility to extend research and technical knowledge across many meaningful educational strategies (Fordham, 1979). The variety of strategies provides the Extension educator much greater flexibility, versatility, and adaptability than their formal classroom educator counterpart to meet the diverse learning needs of each clientele, and to adapt as those needs evolve (Coombs, 1976). Education can happen within numerous contexts. Common educational strategies for Extension education can be broken into three broad categories: An Extension educator can support a learner's knowledge change through (1) face-to-face programming, (2) print, and (3) social media. Each approach has unique considerations for teaching and learning across areas of content, which are discussed below.

Face-to-Face

Many methods exist for engaging learners in person, and each uses a different approach to disseminating research. Clientele and subject matter will largely drive the type of face-to-face instruction. While many of the same teaching strategies for formal education can be applied in the nonformal educational setting, it is important to note the differences. For

example, in most Extension programming, you will not assign homework and will not be giving graded assignments. Also, your learners need to be engaged with real-world relevance—this should also happen in a formal education setting, but sometimes this connection is forgotten. Learners also bring their own lived experiences and expertise into the learning environment. Many different strategies can be implemented and each has a different educational approach.

The in-person strategies vary from one-on-one training or consulting to large format training, to groups of learners co-developing knowledge, or applied hands-on demonstrations. You will notice that each of these teaching and learning modes connect to the theoretical constructs of learning in table 10.1.

Direct client support, such as technical assistance, is a large component of Extension specialists' responsibilities. Stakeholder needs can vary with program area or content. Often, in specific circumstances, specialists may visit clients at their operations to assist directly with troubleshooting, system improvement, pilot testing, or optimizing methods. Extension has a rich history of disseminating information and teaching best practices to the stakeholders they serve. Each discipline may have a different approach or structure for assisting clients. Client assistance is largely dependent on the client's current state and needs. As an example, food science (family and consumer sciences) provides a wide array of services to clientele including food safety consultation on process deviations, interpretation of laws, labeling review, educational information, shelf-life information, product analysis, food safety training, and meeting the requirements for processing and selling food.

Diversity

The work of Extension provides an opportunity for educating and connecting with all of society in a state and/or local region rather than solely those connected to higher education. It is important to develop Extension programs and supporting materials that are inclusive of the broad range of human experiences, cultures, resources, and identities, and to be sensitive to the systemic disadvantage that many groups have experienced (Farella, Moore, et al., 2021). We should strive to remember that programs which have historically been offered by the Extension Service were designed to cater to the needs of the majority, and that we have a responsibility to design—or redesign—our Extension programs to be equitable and meet the needs of everyone (Farella, Hauser et al., 2021; Fields, 2020). Careful assessment of the needs of the communities we serve and, in many cases, further understanding for ourselves as educators, are required to develop inclusive, accessible, and culturally sensitive programming.

Extension provides services such as seminars, training, continuing education, and certifications for clients ranging from producers to general public interest. Extension has and provides the subject matter experts to deliver these training and educational opportunities in diverse content areas. Further, Extension often has a public reputation for disseminating reliable information without bias. Training may be presented in collaboration with state and/or federal regulatory agencies or may be provided to meet regulatory standards and requirements outlined by governing agencies. For example, American National Standards Institute (ANSI) certification (e.g. ServSafe, Safe Plates), Good Agricultural Practices (GAPs), related certifications of Food Safety Modernization Act (FSMA), and Hazard Analysis

Critical Control Point (HACCP) trainings and certifications are required by regulatory agencies depending on the sector of the industry. In agriculture, Extension educators deliver programs which provide continuing education credits for pesticide applicators and programs like Beef Quality Assurance for livestock producers. Extension specialists and personnel/agents often offer these training and certifications as part of their programmatic planning in a way to serve stakeholders. Extension trainers may need additional training and experience to certify participants and lead state training sessions.

Similar to research collaborations, Extension educators also collaborate with colleagues in other states, counties, departments, and universities to diversify and expand programmatic efforts to a wider audience. Expertise among state Extension systems can vary and collaboration allows for better programming that serves both stakeholders and Extension educators. Additionally, within the university, course collaborations are useful as clients may need topic diversity. Generally, entrepreneur series include speakers from across departments (i.e., varied subject areas) as well as topics to provide a general introduction to the subjects.

Using the Food industry as an example, subject matter experts represent agricultural economics, government/regulatory agencies, marketing, food safety, and business (Crist & Canales, 2020). These programs provide stakeholders a foundation of information as well as contacts in the event they need further assistance in that specific subject area. Recently, Extension program delivery has shifted toward using more online educational platforms, certification programs, expert happy hours, and “lunch and learn” series in order for stakeholders to access the information they need as well as provide a forum for questions.

Extension specialists—faculty with a content area focus— can provide programmatic and subject matter competency in-service opportunities and training to Extension agents—county-based Extension professionals. Inservice training is considered continuing education and an opportunity to increase subject matter competency. Further, agents select the programs that they will deliver in the county. Specialists provide in-service training to agents so they may deliver these programs as intended and/or provide additional insight to the execution of the program. Inservice opportunities can include many topics and range in subject matter from youth

development to agriculture and natural resources. Further, inservice training is provided throughout the year and on different education platforms including webinars, face-to-face training or lectures, and online platforms.

Syllabus Development

As Extension educators, it is important to make connections for students in traditional education to career paths and opportunities. As a group, Extension educators need to advocate and share their stories and passion with audiences that may not be familiar with the unique career opportunities of Extension, as most will associate higher education with the pillars of research and teaching. Some students may be familiar with part of Extension either through 4-H involvement or by having parents who were involved in educational offerings (e.g., master gardener). You can strengthen the connection of careers in Extension by incorporating assignments, presentations, and curriculum development into courses. Additionally, your institution may have Extension apprenticeship programs. These types of programs can be a valuable opportunity for students to learn more about the day-to-day Extension roles while at the same time impacting their communities. Integrating some of our communication pathways into syllabi or student experiences will expose them to the multifaceted world of Extension.

Community of Practice

The Communities of Practice (CoP) framework is constructed from the exchange of a group of people who have a shared interest and want to improve on that interest using regular interactions with each other to accomplish that development (Wenger, 1998). Lave and Wenger (1991) introduced CoP to provide a template for examining the learning that happens among practitioners in a social environment comprising both novices and experts. Newcomers use this exchange between these populations to create a professional identity. Wenger (1998) then advanced the focus of CoP to personal growth and the trajectory of individuals' participation within a group (i.e., peripheral versus core participation). No matter the purpose of educational outcome, CoPs can be designed intentionally, fostered informally, or identified after they have developed organically. A CoP can also be an outcome from learning experiences (Elliott-Engel & Westfall-Rudd, 2018) that result from your strategy and lead to connecting people, providing a shared context, enabling dialogue, stimulating learning, capturing and diffusing existing knowledge, introducing collaborative processes, helping people organize, and generating new knowledge (Cambridge et al., 2005).

A great example of direct client support (and farm model training), as well as being the foundation of the Extension service, is boll weevil eradication. The boll weevil was an invasive insect pest that was devastating cotton crops throughout the South in the early 1900s. Seaman Knapp, who has been mentioned previously, was sent to Mississippi by the USDA to help find a solution to the boll weevil infestation. Knapp set up an experimental farm to demonstrate to growers' methods for mitigating the boll weevil damage. The farm opportunity became the model for agricultural demonstration (Mississippi State University Extension Service, 2020; Palmer, 2014). Similar stories exist for other areas and educational formats. For example, the foundation of family and consumer sciences began with home-demonstration clubs that focused on improving nutrition and living conditions for rural families. These sessions continue today and address a variety of topics such as nutrition, cooking, health, mental health, financial literacy, volunteer programs, and home-based businesses (Mississippi State University Extension Service, 2020).

Print Communications

Print media is an important form of education delivery we often think of as andragogy rather than pedagogy. Most, if not all of us, have heard the phrase “publish or perish” in reference to faculty roles. This colloquialism emphasizes that print formats of education are highly valued in the academe. Yet, not all forms of print publication are equivalent or have the same credibility (e.g., burden of peer review), and thus their value is weighted differently by the institution’s Promotion and Tenure review board.

A successful Extension educator should formulate a plan of distribution that includes each level of communication. Figure 10.2 provides a framework for you to think through how you can take your research findings and translate these specific findings into all forms of print communication. An Extension educator should provide multiple communication formats to ensure that the research done on campus is communicated to the citizens of the state they serve.

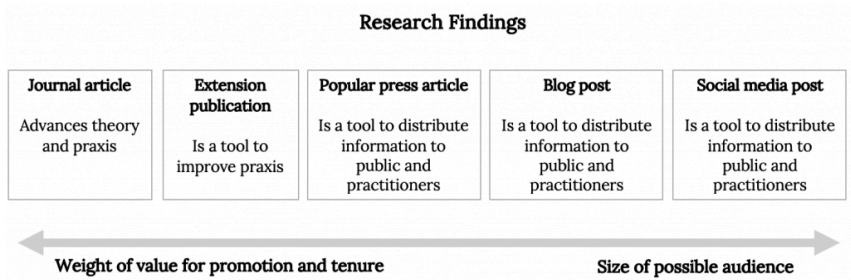


Figure 10.2 Academic production by possible population reach and promotion and tenure value.

It is unfortunate that social media and electronic options give the greatest reach for distributing research findings to a large audience and yet are weighted the least. Social media and other digital forms of publication are hard to evaluate for impact as well as implementation and/or behavior change. It would be easy to become hyperfocused on submitting publications to journals with a high-impact factor because that is what is favored for promotion. Yet, in Extension, we must ask, what is the value

of creating new knowledge if it stays within the walls of the ivory tower? Extension's purpose and mission is disseminating research-based evidence to improve the lives of the stakeholders they serve.

Social Media

Social media may not be commonly viewed as a pedagogical tool or accorded traditional forms of value in academe. However, it is a tool for rapidly spreading knowledge and its reach is hard to ignore in current society. Social media has evolved our consumption of both information and entertainment; it has also changed our preferences on how to consume new information (Subramanian, 2018). The use of social media provides the greatest opportunity to distribute research findings to a wide audience and to affect social discourse both positively and negatively. The field of science communication is rich, filled with best practices for effective outcomes, including language, strategy, and design. We won't address those strategies here, yet we do want to emphasize the need to use and engage with social media and to view it as a platform for teaching. (For further reading on science communication, we recommend Laura Bowater & Kay Yeoman's *Science Communication: A Practical Guide for Scientists*, New York: Wiley, 2012.)

In Conclusion: Extension Is a Bridge

Extension activities should be viewed as a bridge to enhancing and expanding the reach of research-based evidence and technical information from members of academe to stakeholders in need. Faculty who hold Extension appointments should funnel energy into sharing their findings to the betterment of society. Many grants and funding opportunities require a broader impact statement, outreach, expected outcomes, and evaluation component and approach. This is where Extension professionals should shine and can use their expertise to develop methods for reaching and educating the audience where the findings will be most impactful. The

“traditional” researcher may overlook this area of importance, but many funding agencies are placing higher priority on proposals that address how the grant will impact or improve the affected stakeholders. The next chapter, “Program Planning for Community Engagement and Broader Impacts,” will further discuss how to develop and translate knowledge to benefit stakeholders.

Powerful and impactful teaching is rarely confined to the classroom. The Extension system and nonformal education are valuable for early career faculty members and graduate students. We hope that you will integrate the educational approaches from nonformal educational settings into your classroom and engage your learners with issues relevant to our communities.

Not every reader will be an Extension specialist or a county-based Extension professional (a.k.a., Agent), nor will every reader even work at an LGU. However, all faculty have the motivation, if not the obligation, to share findings from your research agenda to the public. Many times this outreach is labeled as “broader impacts” (Donovan, 2019). We hope this chapter helps you see how your teaching and research can become integral to your community. If you are a graduate student seeking a position in higher-education, we hope this chapter has raised your interest in Extension education at LGUs or in developing better ways to communicate your ideas about how to bring community-relevant research and teaching to your research agenda.

If you are reading this while working or studying at a LGU institution we hope this chapter has raised your awareness of the mission of your institution, and that you will seek out Extension professionals to help you in your teaching, research, and outreach efforts. If you do become an Extension specialist, or a county-based 4-H professional, congratulations! You are in for a challenging and rewarding career. We hope this chapter serves as a framework for conducting excellent Extension education programming and provides a greater awareness of the organization’s beginnings, the theory that frames the work, and some basic practices of non-formal education that you can use to maximize community outreach efforts.

Reflection Questions

- When you think about your research and teaching, what public issues do you see yourself ready to contribute solutions and education?
- After reviewing Figure 2, how are you using an array of mediums to share content? Where can you improve your efforts?

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II. Program Planning for Community Engagement and Broader Impacts

JEREMY ELLIOTT-ENGEL; COURTNEY CRIST; AND GORDON JONES

Introduction

Good teaching in higher-education doesn't solely occur in the formal classroom setting. Thus, the objective of this chapter is to help graduate students and early career faculty to plan effective education in a community setting, particularly through Extension education efforts. While this chapter will discuss Extension programs it will be relevant for individuals who want to extend their research through community engagement to achieve broader impacts.

Extension educational programs can include both individual workshops and larger coordinated efforts that comprise a Program. Fordham (1979, p. 1) wrote “‘responding to needs’ as rapidly as possible is often the major justification for creating individual programs;” while there are many developments in praxis of program planning, this approach remains very common in practice (Gagnon et al., 2015). Yet, there is a risk of running from program to program —or need to need— as an Extension educator. If this is the educators method they will be busy and overwhelmed without any demonstrable impact (Arnold, 2015).

How to cite this book chapter:

Elliott-Engel, J., Crist, C., and James, G. 2022. Program Planning for Community Engagement and Broader Impacts. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

This chapter will discuss...

- The principles of program planning.
- Program planning factors including community needs and relationships.
- The principles of program planning in community context.
- How to make community impacts through research and teaching.

Any educator can succumb to the urge to respond in the moment and lose sight of the long-term goals. So, how does the Extension educator find intentional purpose and stay focused on the overarching goal? They plan.

The commonly accepted program planning model consists of six aspects (Cafarella, 2002; Cummings et al., 2015; Sork & Newman, 2004):

1. Planning Table: Analyze planning context and client systems
2. Needs assessment: Assess needs
3. Logic modeling: Develop program objectives
4. Formulate instructional plan: Prepare to teach across many modes
5. Formulate administrative plan: Prepare to implement and utilize relationships to plan
6. Evaluation: Design a program evaluation plan

It is important to note that while these steps are presented in a sequential order, they rarely occur linearly in practice (Arnold, 2015; Houle, 1996; Morell, 2010; Netting et al., 2008).

Analyze Planning Context and Client Systems

Extension educators, even more than classroom educators, need to understand the social and political context of their work. Extension educators conduct their work in local communities and engage with diverse and established ideals and knowledge. Understanding the political context of program delivery is important because, although community education work can increase political capital (Place et al., 2019), educators and the organization can also experience backlash (Elliott-Engel, Westfall-Rudd, Seibel et al., 2021). Recognition of the social context allows the educator to navigate appropriate partnerships and messaging. Further, each community and audience has cultural differences. The Extension educator must be sensitive to cultural differences in their many forms, not only differences in demographics, but also in language, religious affiliation and spiritual practice, values, and family and kinship patterns (Fields, 2020). The Extension educator must design and implement education that is responsive to these differences and engages these learners (Sork & Newman, 2004).

- A superb resource for in-depth guidance on program planning is the book *Planning Programs for Adult Learners: A Practical Guide* by Rosemary S. Caffarella and Sandra Ratcliff Daffron.
- An excellent resource for further reading is *Working the Planning Table: Negotiating Democratically for Adult, Continuing, and Workplace Education* by Ronald M. Cervero and Arthur L. Wilson.
- An excellent resource to explore social justice and societal context read *Privilege, Power, and Difference* by Allan G. Johnson.

Assess Needs

Training needs assessment is an ongoing process of gathering data to determine what training needs exist so that training can be developed to help the organization accomplish its objectives. ... Often, organizations will develop and implement training without

first conducting a needs analysis. These organizations run the risk of overdoing training, doing too little training, or missing the point completely. (Brown, 2002, p. 569).

Once you are familiar with the planning context and client systems they will frame your ability to collect data in order to inform your understanding of your community needs. A needs assessment is essential to ensure the effectiveness of your Extension education efforts (Angima et al., 2014). Needs assessments are data driven and should help you identify gaps between current results and desired outcomes (for you and your community) and place the gaps in priority order (Kaufman et al., 1993).

To begin your needs assessment you must first establish what you want to know that will inform your educational program design. This will define the data collected. The data you collect can and, in many cases should, be wide ranging (e.g., Census or publicly available economic data, interviews with key stakeholders, surveys of your target clientele, focus groups, or even the photovoice method (Wang & Burris, 1997)). This data collection should be rigorous and theoretically informed (Arnold, 2015). Using a theory of behavior change (refer to Table 10.1 in Chapter 10) your needs assessment data should help you delineate what you can do to respond to the needs of your audience.

Make sure you maximize the effort you put into your needs assessment by publishing the process and/or the findings.

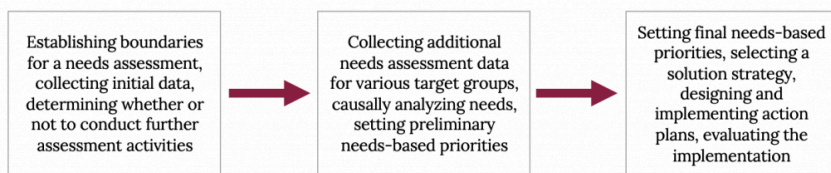


Figure 11.1 Phases of a Needs Assessment.

- For further reading on how to establish a strategic plan, refer to *Strategic Planning Workbook for Nonprofit Organizations* published by the Amherst H. Wilder Foundation.
- An excellent print resource for further reading and implementation is *A Practical Guide to Needs Assessment* by Kavita Gupta.

- Extension bulletins often cover needs assessment, such as *Needs Assessment Guidebook for Extension Professionals* by J. Donaldson and K. Franck or *Methods for Conducting an Educational Needs Assessment* by P. McCawley.

Develop Program Objectives

Using your needs assessment you now have established a direction for your Extension education efforts (McLaughlin & Jordan, 2004; Taylor-Powell, & Henert, 2008). There are two levels for you to consider when developing learning objectives: There is the macro level of identifying the long-term changes you are trying to accomplish, and there is the learning objective of each of your educational workshops. Unfortunately, in Extension education vernacular, both are called programs. The first occasionally are referred to as “Big P programs,” while the latter are often called “little p programs,” We will use these terms for this discussion.

Establishing objectives for your “Big P Program” takes on many of the characteristics of strategic planning. You will identify the long-term outcomes you want to see over time, and you will need to establish the many short-term goals necessary to accomplish these objectives. These plans should lead toward significant changes in society or in your organization (Elliott-Engel, Westfall-Rudd, & Corkins, 2021). These objectives are the overarching goals you have for your Extension work and will be the basis for all of your “little p programs.”

For your “little p programs,” Extension educators have adopted the use of logic models (Israel, 2001; Taylor-Powell & Henert, 2008). The logic model is a sequential causal relationship tool. It allows an educator to connect theory of change with the objectives sought. However, many program logic models are built on the “assumption that new knowledge leads to attitude change, which leads to behavior change” (Patton, 2008, p.108). The sometimes simplistic program plans developed in Extension, when they are developed at all, focus on creating change without considering the pervasive systems in which that change happens and the influence the system can have on whether changes take place (Arnold, 2015; Arnold & Nott, 2010; Patton, 2008).

At worst, logic models are developed based on erroneous assumptions and unsound theory, which leaves the measurement of program outcomes incapable of demonstrating program impact.

Program Logic Model Framework

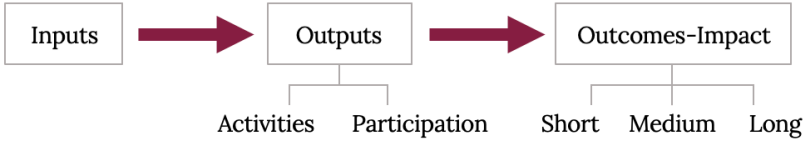


Figure 11.2 Program Logic Model Framework.

Of course, as a new educator you do not want to replicate the shortcomings of those who have come before. To improve logic model utilization, it is important to first consider which outcomes you want to achieve, and then identify the inputs you will need and what outputs you will develop. These outputs are your objectives.

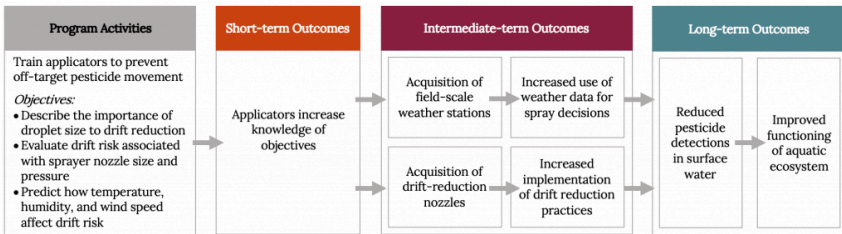


Figure 11.3 Example of a Program Logic Model for Reducing Pesticide Contamination to Surface Water

Figure 11.3 shows an example of a program logic model related to pesticide application techniques and drift prevention. In a watershed in southern Oregon, a group of agricultural professionals, local organizations with a focus on water quality, Oregon State University Extension Service, and concerned citizens engaged with the Oregon Departments of Agriculture and Environmental Quality to monitor streams in the watershed for

pesticide contamination. The water quality results indicated some pesticides were likely drifting into surface water from air-blast applications to orchards and/or vineyards. In developing the logic model, we worked backward from the long-term goal of reduced pesticide detections and developed learning objectives targeting specific drift reduction mechanisms. We delivered both classroom and hands-on programs and shared print materials to provide a range of learning opportunities. Through our follow-up evaluations, we learned that many producers in the region have adopted the recommended strategies, and we await further water quality results to determine the real environmental impact of our program. Taylor-Powell & Henert (2008) is a great resource to help you develop your own logic model.

Syllabus Development

In a formal classroom setting there are many ways to bring nonformal education into the syllabus; these include adding a community education component to a group project (i.e., creating a YouTube video or social media graphic, or presenting to a community partner). Asking a learner to teach their content is an excellent way to demonstrate content knowledge, help expose gaps in knowledge, and build a deeper understanding. In addition, you could partner with local Extension educators across the state to help students see how the issues they are learning about in the classroom are being experienced in other communities, or to learn how people are addressing the issues. These approaches can help you develop and prepare educational materials to support your Extension education agenda, and can also help make a real-world connection to the class topic for the learner.

Formulate Instructional Plan

Now that you have long-term objectives and know how to connect those objectives to your long-range goals, what should you teach, and in what format? Formulating your instructional plan should start with your learners in mind. Who are your learners? What do you know about their knowledge on the topic? And, of course what educational goals do you want to accomplish?

Choosing what will be taught during a learning activity is a challenge because of time limitations, delivery modes, the varied backgrounds and experiences of the participants, materials available, and your own capability or style (Alessi & Trollip, 2001; Wlodkowski, 2008). To arrive at what is important, you can construct visual tools, such as a content map or outline. You can also talk it through with a colleague or knowledgeable stakeholder.

Caffarella and Daffron (2013, pp. 185-186) encourage the Extension educator to think about the following questions as they formulate the scope of the teaching:

- What content is essential for learners to know and does this content address one or more of the learning objectives?
- What is the content that learners should know, which supplements the essential material?
- What is the content that might be interesting and relevant to the essential materials, but will only be addressed as time allows?
- What is the content that learners do not need to know (that is, it may be useful but does not pertain to the learning objectives?)

The above questions help the Extension educator set parameters of their content, just as a formal educator formulates a syllabus using similar objectives. Yet, the Extension educator also has to assess the framework for relaying the content. The Extension educator has many instructional techniques at their disposal. Earlier in the chapter, there was a discussion of the types of techniques the Extension educator will use to decide on which approach is most effective for learner knowledge change.

The Extension educator can ask themselves the following questions for clarity:

- What is your capability and preferred style of instruction? (e.g., your comfort facilitating)
- What learning environment is most effective for the learners' characteristics? (e.g., different ways of knowing)
- What is the environment available to offer learning? (e.g., physical and virtual environments)
- What additional learning resources are available to me? (e.g., print, video, hands-on projects)

The nonformal learner should be valued for their possible contributions to the learning environment and co-creation of understanding and knowledge is an important assumption for the Extension educator. To do this the Extension educator will adopt teaching and learning opportunities that allow for knowledge transfer and discussion and opportunities to experience the phenomena being discussed (Moseley et al., 2019). Experiential learning is based on a theory of sociocultural experiences (table 11.1, refer to Kolb, Dewey, Piaget) and an educational philosophy which educators can adopt.

Experiential learning can be a challenge for any educator, including the Extension educator. As you try out new techniques it is important to engage the learners in the process to prevent discomfort by the instructor or the learner. For example, you can choose to inform the learners that you are trying new techniques and would welcome feedback on whether they worked. Feedback can also be solicited in the form of written responses to open-ended questions at the end of the session. This allows both learner and educator to reflect on the process and establishes both individuals as valuable to the process.

- A great resource on experiential learning is *Learning through Experience: Troubling Orthodoxies and Intersecting Questions* by Tara J. Fenwick.
- A great resource for specific tools for developing nonformal learning objectives is *Planning Programs for Adult Learners: A Practical Guide* by Rosemary S. Caffarella and Sandra Ratcliff Daffron.

Formulate an Administrative Plan

An administrative plan is the behind-the-scenes frame for how to execute your Extension education efforts. Finally, a conversation about the planning is needed for implementation. As always, the better the plan, the better the outcomes (Mehta & Mehta, 2018). An administrative plan involves recognizing your available time commitment (job description and appointments), budgets, and resources (e.g., personnel) needed to implement the plan.

Your Appointment and Job Description

Your appointment and job description will determine how much Extension education you will conduct in your role. Even faculty with zero Extension commitment, however, would be remiss if they did not ensure their research has value to the broader society, especially to Land Grant University (LGU) faculty. We only have so many hours in a day, and there are many demands on a faculty member's time, so Extension education efforts must be planned with your other commitments from research and teaching in mind.

Extension efforts are, too often, an afterthought and are viewed as secondary or viewed as a second job on top of the teaching and/or research efforts. To be successful as a LGU faculty Extension education efforts should be embedded throughout your work and viewed as an important portion of your work to make a public impact. The more time and intentionality you invest in planning and informing your work with your needs assessment findings, the more likely you are to ensure your contribution to and impact on the stakeholders is maximized.

Funding Your Extension Education Work

In the higher education setting the ability to generate funding is increasingly important for professional success. No one will dispute that funding matters. It is important to keep in mind your big P objectives and little p opportunities

when seeking funding. If you are clear about your goals, then you will be able to ensure *grants are funding your efforts* instead of *your funding being your efforts*. Being clear about what your audiences need and want is important as you seek funding to make your programs happen. First, you must know what your financial needs are to make your Extension education programming happen; second, you can discern what opportunities make sense to your goals; and third, you should think creatively about how a grant's objectives intersect with your own. You will already be further ahead in your grant writing because you will have clear and well outlined objectives, informed by needs assessment data (that is hopefully published).

Increasingly, federal granting agencies discuss the term *broader impacts* (Donovan, 2019). Broader impacts are those short- and long-term impacts that our communities realize because of the research conducted. Extension education efforts are always a portion of the broader impact conversation, although it is rarely specifically mentioned despite the relationship between Cooperative Extension and the federal government. An LGU faculty is in a unique position to be supported in these efforts because of the Cooperative Extension expertise of the LGU, and the network of county-based professionals across the state.

Relationships

Relationships are important for your success. We have all heard about the value of networking for professional success. Relationships are important within academia and throughout the community. Relationships and networks are informed by power, and planning for education is a negotiation between power and knowledge. Thus, forming an administrative plan is not a quotidian task. Rather, it is fraught with critical decisions that will have implications for you and the people you choose to educate.

It will be important for you to think about the relationships that you build not only as social capital but as the opportunity to understand your educational context more effectively. Your relationships will be your access to new audiences and to ensure support for the programming you offer. These relationships will also inform the feedback you receive (Cervero & Wilson, 2001).

The relationship between county agents and campus-based Extension specialists is fundamental to the functioning of both an Extension service and the LGU model. In agriculture and natural resources, as in the other program areas, the system functions at its highest level when there is rich interconnection between field and campus faculty. County agents serve as the front line in identifying new challenges and opportunities facing agriculture, forestry, and other managed ecosystems. When those challenges and opportunities are beyond the technical or logistical capacity of agents, Extension specialists help to provide expertise, grant-writing, and research support to ensure that clientele are well served. When an unknown insect, disease, or nutritional deficiency begins to show up on farms or a new crop or technology takes hold in a region or state, the benefits of having a network of faculty and agents becomes clear. County faculty will have direct, personal connections with local producers, will be a valuable resource in identifying those emerging needs, and can form a vital network of research partners to validate or demonstrate new practices across the state. Extension specialists will oversee or conduct the applied research to answer new or lingering questions, lead the development resources and Extension programs, and serve as subject matter experts for county faculty to rely on. The back-and-forth collaboration between county agents and Extension specialists is a keystone in delivering helpful and impactful non-formal education and technical assistance to clientele.

County agents (this title varies by institution) are often the front line of Extension and the heartbeat of the county as they serve state stakeholders and communities. In the event a client has a need or question, in some state Extension systems they are encouraged to directly contact the county Extension office first instead of a subject matter expert or Extension specialist. For example, in the Extension program area of family and consumer sciences (FCS), as in the other areas, specialists answer stakeholder questions through agents. Additionally, programming ideas may be derived from agent experiences or common questions that are received at the office. In other words, agents often identify gaps in programming and agents and faculty may work together to develop programming. Some programming may have different categories (e.g., agent-delivered, agent-coordinated and specialist-delivered, specialist delivered). In agent-delivered programs, agents are often trained to deliver the content (inservice

training). Agents select these programs from a program of work that they deliver over the course of a year. Programs may vary in their time, duration, and number of meetings.

The organizational structure of Cooperative Extension will vary by your LGU. To give you an example of how individuals across an LGU may work to support community education we share this example. At Mississippi State University specialists are expected to develop and manage at least one statewide program that agents may choose to offer in their counties. FCS, one of the core program areas, conducts programming that ranges from childhood development, finances, home economics, food safety, home food preservation, nutrition, exercise, etc. As an example, a home food preservation program was developed to serve state stakeholders when agents identified a gap in programming. Some agents have significant canning experience while others do not. While agents have the ability to conduct subject sessions in their county, only specialists can develop statewide programs; however agents can contribute and assist with the development. Home food preservation was developed in coordination with two county agents that have experience with home canning. The specialist(s) met with the agents to determine the sessions, lab activities, and program modules. Then the specialist developed the program and agents in the state pilot tested the program to work out content and guidance.

Feedback is very important for the success and execution of a program, especially when lab activities are involved. Once the program is finalized, agents will select the program (if interested) and attend inservice training (competency) to learn the content and lab activities (hands-on). Agents will then conduct the program in their county with their interested stakeholders. Generally, there is an evaluation piece to assess knowledge change and competency. In closing, agents are invaluable resources and are experts in their ability to extend knowledge. As a Specialist, it is important to make agents who have client questions a priority as they are the “face” of Extension. Agents are a vital part of the team and developing relationships and rapport with them is essential to success. Remember that agents want to see you and you should be involved.

No matter your area of expertise you will have varying levels of administration. For example, a county-based faculty member will have a County Director, and a Program Leader; a state level specialist will have a Department Head and a Program Leader. There may be other administrative structures depending on your university Extension organization (e.g.,

Regional Directors, Unit/Program leaders). Individuals in these administrative roles have the responsibility to inform you of your specific job duties, provide a supportive framework for your success, and serve as coach and mentor. Individuals in this role will help you navigate the many vagaries and pitfalls of the public interface and they should be viewed as a resource for program development. They have a different vantage point in the organization and may be able to connect you to your peers with similar work, or to other partners across the university, state, or country.

Keeping your administrators aware of your work is important—the more they know about what you are working on the more they can help you be successful. However, updating your administrators about your programming should be done succinctly and with respect for their time and role. More is not always better. Be judicious and respectful about time and place. No one likes a hard sell, and that strategy can backfire. Also, going above someone's head without notification is rarely appreciated. Higher education is a bureaucracy and as such you should navigate through the chain of command, not because you could get what you want by jumping levels this one time, but because administrators in higher education are long-timers and building the relationships and following the organization norms will help you go farther for the long-term.

Partners

Our fast-changing world means that we cannot have all the answers; especially when it comes to solving problems, we must collaborate. In addition to making our resulting outcomes more effective, working as a team is just plain more fun, and the research shows if teams are more cognitively diverse, then they also arrive at better solutions (Aggarwal et al., 2019; Olson et al., 2007). Your partners should

- complement your areas of job performance weakness,
- bring new audiences to your program,
- bring new perspectives to your program,
- be responsible for the work they say they will do,
- be professionals who you respect, and
- be enjoyable to work with!

Your partnerships need to be authentic and reciprocal. Authentic partnerships are based on mutual respect and value for the person and organization even when there is no specific ask on the table. Reciprocal partnerships are based on mutual benefits. Do not confuse reciprocal with transactional (Burns, 1978). Reciprocity in successful partnerships is about working toward both parties' best interests and being conscious about stewarding the relationship.

Partners are also important in maximizing impact (Bryson, 2004); they are important for your Extension education capacity to maximize your outreach, but also for many other aspects of your professional needs, not limited to grantsmanship and research. Partners have different networks and different vantage points, thus as you select the people you choose to call your team, do so with intentionality and care.

Balancing the Needs of So Many

There are different community scopes for Extension educators. Some educators view their workspace as encompassing both national and international reaches; others see their target community as a whole state; while yet others have a countywide or regional scope. No matter the size of the target community you will inevitably be pulled in too many directions, and without both a clear commitment to your overall objectives and an administrative plan you may very well find yourself going from problem to problem feeling very busy but not accomplishing much.

So, how do you find the right balance when there are so many demands? Your assessment of opportunities will need to be based on your overall Big P Program objectives and capacity for easy implementation of your little p. In theory this is easy to address, but it is incredibly hard to handle in practice. When you are certain of your objectives and your administrative plan you will have clear parameters to establish a framework for how to assess your ability to meet those needs. The framework will help you choose what opportunities you do want to get involved with or not when you are asked to take on an additional project. The framework rooted in your objectives and administrative plan will also give you language to explain

why you are making this choice even as you are pushed and pulled by stakeholders, clientele, administrators, and funders and even as you become excited about the possibilities of other work.

As you balance the needs of so many people do not lose the forest for the trees. You will have a group of clients that become super users and will want a lot of your attention; this is a sign your program is valued. You will also want to ensure you are balancing the needs of both the many and the elite few high-profile clients. In a different instance of balancing service to different clients, we used the example of publishing. While publishing an article in a top-tier journal will be valuable for your promotion and tenure packet, if you have not also identified ways to ensure that new information is valuable to your community then you may have achieved one of your objectives, but you have lost sight of the long-range impacts of your work.

The concept of program integrity, defined as the degree to which a program is implemented as originally planned, is the core of your programming implementation. As described by Dane & Schneider (1998), program integrity consists of five main dimensions:

- **Adherence** refers to how closely program implementation matches operational expectations (Duerden & Witt, 2012).
- **Dosage** represents the amount of a provided service received by a participant (Duerden & Witt, 2012).
- **Quality** of delivery deals with the manner in which the service was provided (Dane & Schneider (1998).
- **Participant** responsiveness measures individuals' engagement and involvement in the program (Domitrovich & Greenberg, 2000).
- **Program** differentiation identifies program components in order to ascertain their unique contributions to the outcomes (Dusenbury et al., 2003)

Diversity

Nonformal education program planning is about using intentional processes to ensure successful outcomes. Extension education is about extending the research-based information generated on campuses to community members. Therefore cross-cultural competency and understanding is fundamental to effective programming (Elliott-Engel, Westfall-Rudd, Seibel et al., 2021) and good program planning is essential. The Extension educator should be conscious of the many communities they are engaging with and take intentional steps to reduce barriers to information consumption (Intemann, 2009). Intentional interventions can include translating content and materials into appropriate languages in the communities they are reaching; ensuring graphics and other media are accessible to those with visual or hearing impairments; and tweaking program design to address the cultural characteristics of the communities you are working in (Farella et al., 2021). Extension educators also need to establish expectations within their programming to ensure a welcoming environment for all participants. Gonzalez et al. (2020) identify that to be inclusive, in their case LGBTQ+ youth, Extension educators will need to focus inclusion efforts at multiple levels, including: systemic advocacy, guidance and protocols, programming, and professional development and dispositions.

Bringing the Science to the People

Extension (both service and outreach) education connects research and teaching missions of the land-grant university to the citizens of the state. The Extension educator can, and should, serve as the conduit for not only your own research, but also that of others from campus. The larger your Extension education appointment the more likely you will be in a role of helping extend someone else's research to the community. When others are conducting research or submitting grants, Extension educators can be brought in as key partners. You want to position yourself with faculty across campus in your role of expert—both in your content knowledge and your skills as a translational communicator.

Our universities are large bureaucracies, filled with many boundaries (or silos) between individuals. As Extension educators we should be trying to eliminate duplication of effort in extending research. Extension education work is translating research to the layperson, yet because individuals across our institutions are so often unaware of the land-grant mission, or the specifics of Extension, they end up reinventing the wheel. Do not recreate the wheel for extending knowledge. If you are an Extension educator, then keep up the advocacy for your mission and the value of the work you offer. Broader impacts are important, and Extension education can deliver these to communities across your state.

Also, as an Extension educator, Extension is the original open access content. Extension materials can be adapted, updated, and used with your new audiences. Of course, make sure you give attribution for the original work and make sure it is updated for your purposes.

Evaluation, Metrics, Defining Impact, and Use of Results

It will be no surprise to anyone that evaluation is an important aspect of your Extension program. Evaluation is often overlooked, yet it should be the foundation of your program planning. You will not be surprised to learn that evaluation is regularly viewed as a chore, an afterthought, or the follow-up work. This is unfortunately the case for far too many educators; Extension educators are not exempt despite a considerable focus on evaluation by administrators and in program-planning training. This section of the chapter will not teach you *how* to evaluate, but it will give you a framework to think about how to implement and use evaluation data.

By ensuring you have great learning experiences that are linked to learning outcomes, program conceptualization is the start of evaluation. Yet, Extension education has many different ways of measuring and conceptualizing impacts. While the Extension educator is of course interested in the learners' knowledge change, there are also considerations for long-term behavior change, and the societal results when many individuals make similar changes.

In order to build support for Extension, “public value stories and statements” (Chazdon & Paine, 2014; Franz, 2013) or “public good” (Franz, 2011, 2013, 2015) are often used in place of the word “impact.” To measure indicators associated with impacts, an emphasis has been placed on evaluation (Cummings & Boleman, 2006; Franz et al., 2014). This is not a movement solely in Extension—it is also occurring across the public and not-for-profit sectors.

The impact on the individual learner is a private value. Private values (Lukes, 1973; Franz, 2011) are products and services that directly benefit private individuals and are consumed by those individuals. People typically access these products and services as paying customers in direct, voluntary economic exchanges. To evaluate private values, a pre- and post-survey strategy is effective at the point of delivery. Understanding learner knowledge change is the first evaluation building block. Follow-up to measure behavior change is needed after the training.

The impact on the broader community is a public value. Public value is consumed collectively by the citizenry rather than individually by clients or customers. It includes things that economists call “public goods” which are “jointly consumed,” “non-rivalrous,” and “non-excludable” (Donovan, 2019). This means that one person can consume them without reducing their availability to another person, and also that nobody is excluded from consuming them—for example, public parks, clean air, and national defense (Alford & Hughes, 2008; Moore, 1995). Metrics to measure public value (Franz, 2013) are needed. To communicate public value effectively you will need to find metrics that connect the individual knowledge change to impact (Haskell et al., 2019; Place et al., 2019). It is not uncommon for knowledge change and outcomes to be connected only theoretically (see Logic Model; Travis et al., 2018).

The data we collect implicates the perceived value of our Extension education efforts. Figure 11.4 highlights that both individual and public value data can support public value perception, yet for stakeholders (in this case government funders) public value is placed above individual experience and individual good.

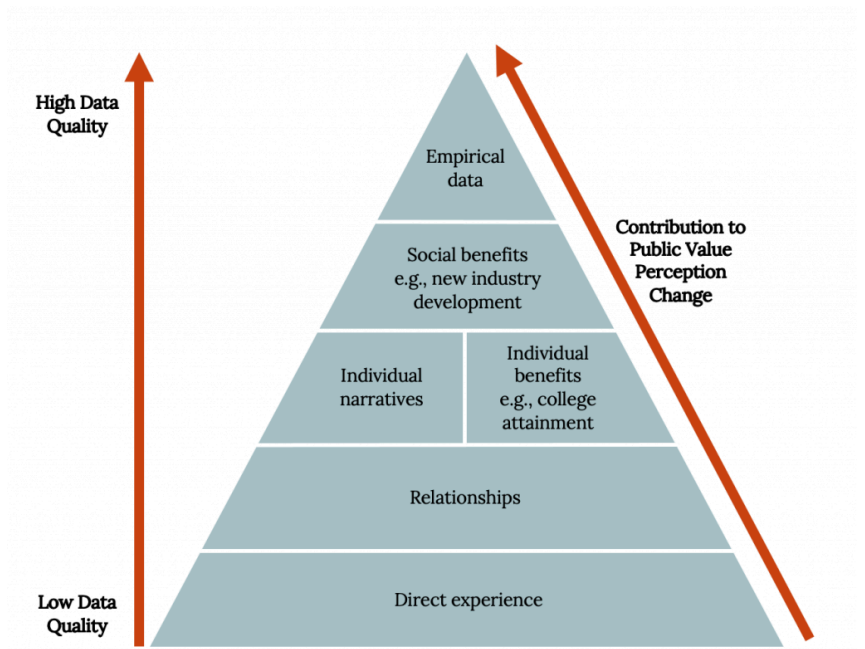


Figure 11.4 Data value to increased public value perception change.

Evaluation is important in communicating the “why” of your program to funders and stakeholders. Figure 11.4 illuminates the importance of empirical data for supporting the relevance argument. Yet, as an Extension educator you will need to critically assess your own programming using evaluation data to inform the effectiveness of a program. You can use these data to adapt your program to ensure goals are being met or you can choose to discontinue a program because you are not seeing the returns you would expect or the return on investment that makes it worth the expenditure of time or money.

Evaluation is a tool, one that should be embedded into your program model; the sooner you start incorporating an embedding evaluation into your program the more effective you will be. The quality of your program will increase, and you will be more able to share how and why your programming is valuable.

- An excellent resource for a deeper dive into program evaluation and assessment of public value is *Program Evaluation Theory and Practice* by Donna M. Mertens and Amy T. Wilson.
- An excellent resource for assessing learner outcomes is *The Reflective Educator’s Guide to Classroom Research* by Nancy Fichtman Dana and Diane Yendol-Hoppey.
- An excellent resource on understanding broader impacts is chapter 24, “Assessing the broader impacts of publicly funded research” by Claire Donovan in *Handbook on Science and Public Policy*.

Focused Excellence and Impact

After reading this chapter and this book, you may be completely overwhelmed with the many aspects of developing effective teaching, research, and Extension efforts. This is where your focused excellence comes in. Focused excellence is a framework for you to narrow, screen, and assess the many opportunities you are offered (Parrott et al., 2020). Only you can determine what your focused excellence will be, but your focused excellence should be the topic on which you want to be considered the expert, and the area you build support for through your research and

Extension efforts. Focused excellence is targeted at a program in the Extension education context, such as childhood nutrition, 4-H youth civic engagement, or parasitic insects in livestock. These are examples of discrete categories that an Extension educator may choose as their area of focused excellence. Within this area you will use the program planning development model and establish focused objectives. To achieve focused excellence you will concentrate your attention on building depth and program quality in your programming rather than flitting from task to task and project to project. To achieve your own focused excellence you will develop strategies to maximize every effort for integrating research, teaching, and community education (a.k.a., Extension). The key to success is finding efficiency and optimizing opportunities to serve a dual role; this will not only benefit you, but will affect the impact and involvement of others. Extension education is a rewarding career path, where your work and effort directly impacts the community which you serve.

Reflection Questions

- Are you using an intentional program planning process in your community education efforts?
- Who are your current stakeholders and what feedback do you use to establish your research and teaching priorities?
- What do you do to maximize your efforts to spread your research to the community? And, how do you maintain focused excellence?

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12. Personalized Advising that Is Purposely Inconsistent: The Constants of Great Advisors and the Variability that Demands Adaptability

WILLIAM MOORE

Introduction

Congratulations! You've earned your graduate degree and landed a job in academia. This in itself is quite a feat! Your mentors have helped prepare you to conduct your own research, secure extramural funding, and speak publicly about your research. Perhaps you've even had teaching experience or better yet, received some formal training in pedagogy. Your new supervisor mentioned in passing that you would be expected to serve as an academic advisor for some of your students. Piece of cake, you thought, all you need is a course catalog and a list of degree requirements, right? How hard can it be?

A couple of weeks prior to the first day of class, you receive a list of advisees and appointment times from the registrar's office. Reality sets in. You are in the hot seat. Maybe you're confident. Maybe you're a nervous

How to cite this book chapter:

Moore, W. 2022. Personalized Advising that Is Purposely Inconsistent: The Constants of Great Advisors and the Variability that Demands Adaptability. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

wreck as the weight of responsibility rests heavily on your shoulders. If you find yourself even somewhat in the latter category, allow me to remind you of the adversity you've already overcome. Your success to this point means that you have a recipe for success in your toolbelt, but perhaps you've been too busy writing your dissertation to think about it.

This chapter will discuss...

- Skills and characteristics of effective advisors.
- How to develop and hone your own advising philosophy.
- The merits and drawbacks of various advising techniques and strategies.

The purpose of this chapter is not to provide an exhaustive explanation of advising techniques and sociological defenses for each one, but rather to help bring your recipe for success to the front of your mind; to serve as a companion as you take time to ponder the contents of and begin to articulate your recipe. Finally, I am here to offer some research-based advice, from a “been-there-done-that” standpoint, to help strengthen your advising philosophy and explore the merits of other techniques and strategies as you learn to tweak your recipe for success to meet the needs of an infinitely diverse student population.

Before we dive into the content of this chapter, consider the following questions: What interpersonal skills and styles facilitate great advising? At which of these skills are you particular adept? Which of these skills could admittedly use work? How do you present yourself in such a way that your advisees recognize your warm, caring advisor heart? How do you train your ear to be one that listens and hears your students? Are any of the thoughts that have just crossed your prefrontal cortex more important than others?

An entire book could be written on any of these topics. However, the goal not being to provide an exhaustive list, I urge you to consider these questions as you read these next few pages.

Behaviors and Characteristics of an Effective Advisor

While it has been reported that students tend to be most satisfied with the advising administered by an advising center staff compared to that offered by individual faculty (Belcheir, 1999a), it is understood that some readers work at institutes of higher education that do not provide their faculty with such an asset. Before moving on to discuss the various aspects of this section, note that personal experience has so far found it to be true that “you can only lead a horse to water,” so to speak. Research supports this observation in that extraverted students have reported to have perceived higher quality and more satisfying advising experiences than introverted students (Mottarella et al., 2004). The study also found that a majority of students, regardless of their personality, desire to establish warm and supportive relationships (Mottarella et al., 2004). This supports the rationale that advisors should take time to reflect on their own interpersonal skills and relationship-building approach, such that they are best suited to facilitate this warm and supportive environment. Thus, this chapter will focus on things that can be done and should not be done to strengthen the ability to “lead the horse to the water.”

Approachability

The introduction to this chapter mentions the weight of responsibility placed upon advisors. The purpose of its mention is twofold; (1) to strengthen their confidence by serving as a reminder that they’ve already overcome great adversity to get to the position they’re in and (2) to reiterate that advising is not a task to be taken lightly as it is critical for the academic success and personal development of the students (Amenkhienan & Kogan,

2004; Latopolski, 2018). Student success is very much associated with the quality of advising. In a meta-analysis of studies on doctoral student attrition and persistence, the single most frequently occurring finding was that successful program completion is related to the degree and quality of contact between students and advisors (Centra, 2004). Warmth and support from the advisor have also been shown to be important factors in advisee satisfaction (Mottarella et al., 2004). For a warm and supportive interaction to occur, advisors must first position themselves in a way that invites interaction; in other words, advisors should consciously do everything in their power to make themselves *approachable*.

Age Doesn't Matter... But If It Does, New Faculty Have an Advantage

While some advising techniques might require extensive time, dedication, and practice to master, rest assured that neither youth nor inexperience hinder approachability. One common misconception about advising is that those who have extensive teaching experience tend to make the best advisors. This can be refuted by noting that freshly minted products of higher education are more likely to be able to empathize with the students compared to more seasoned faculty. A study (Eberdt, 1968) aimed at defining selection criteria for secondary school counselors studied characteristics of secondary teachers who had been rated as most and least approachable by their students. Interestingly, the data indicate that teaching experience and even intellectual ability tend to impede approachability. In fact, personality factors are suggested to be as important, if not more so, than academic ability (Eberdt, 1968). More recently, it has been shown that student satisfaction with an advisor is more likely be dependent on the advisor's interpersonal skills and style than on their advising approach (Mottarella et al., 2004). Indeed, research has shown that the advising climate is dependent on the extent to which an advisor provides facilitative conditions such as listening and hearing (Whiteley et al., 1975).

Relationship Building Requires a Time Commitment

Regardless of the advising approach, the establishment of a warm and supportive relationship can be foundational (Mottarella et al., 2004). Even an intrusive and/or prescriptive approach to advising (discussed later) does not require cold, unsupportive, uncaring advising (Mottarella et al., 2004). Also, despite it having been reported that students who have previously received academic advising tend to indicate that female advisors are typically more empathetic (Nadler & Nadler, 1993), this may be because female faculty have been shown to devote more time to advising than their male colleagues (Bennett, 1982). Thus, in addition to facilitating a warm and supportive advising environment, it is of paramount importance that an appropriate amount of time is devoted to advising.

This begs the question, what sort of advising tasks should merit a significant time investment? An advising appointment can be likened to an exam. Time should be spent in preparation in order to ensure success; however, regardless of time spent preparing, if the actual process is rushed, it is easy to leave points on the table. In other words, it is important to allow ample time to engage with advisees. During an advising appointment, the advisee should be the focus of the advisor's undivided attention. The following remarks by John Dewey (Dewey, 1938 p. 79) support this rationale:

Once more, it is part of the educator's responsibility to see equally two things: First, that the problem grows out of the conditions of the experience being had in the present and that it is within the range of the capacity of students; and, secondly, that it is such that it arouses in the learner an active quest for information and for production of new ideas.

To put Dewey's remarks in the context of advising, students/advisees exist in a certain social environment, and time should be taken to be cognizant of this in anticipation of the advising interaction. Further, it would be beneficial to spend a few minutes allowing the student to engage in a dialogue with the advisor about this context. Advisors must also take the time to ensure that any prescriptive tasks are within their advisees' capacity to succeed. Finally, time should be spent helping students see the relationships between their academic milieu as well as the relationships that exist between this

milieu and their goals. Such attention contributes to the intellectual growth of the student by pushing them to strive to be active learners and productive scholars in a broader context.

If the reader is anything like the author of this chapter, this seems a daunting task. This work is being written from the perspective of a person of admittedly poor memory, especially pertaining to faces, names, and details about the lives of other people. Further, the author's office epitomizes disorder. These personal flaws require extra steps to ensure that the approach to advising is organized so that time allocated for advising can be maximally invested in the advisee.

First, I recommend that advising files/folders have a distinct color. It is helpful to only use this color folder for advising. There should also be a special place for advising folders and for all things advising. The contents of advising folders don't have to be anything extraordinary. Keep it simple. Academic records, an updated program of study, and some minute profile information (i.e. career goals, extracurricular activities, likes/dislikes) is generally sufficient. However, a typically disorganized person might find it helpful to have a place in the folder to take notes that can be used to interact with the student both personally and academically. For example, seeing a student's name in a school publication about some meritorious endeavor could be noted so that congratulations can be extended. If a student discloses any likes/dislikes (e.g., they hate art), make note of that. Further, interview notes regarding students' career goals (this likely will be updated multiple times for most students) can be recorded here. This information can be used to build a personal relationship with each student, serving as a cornerstone for the Deweyan-inspired approach to guiding student learning during advising.

Certainly, these things require an initial time investment, but they are incredibly valuable. Before every advising appointment, time should be spent reading through these notes, and jotting down any thoughts/concerns that should be discussed during the next appointment. Regardless of the method(s) used, it is imperative that enough time is allowed in the advising appointment to be able to engage with the student personally, allow the advisee to discuss their concerns and reason for the appointment, allow the advisor to discuss their concerns with the advisee, and emphasize how everything that has been discussed points towards the greater goal of the advisee's calling.

Disposition/Demeanor: “Why don’t you smile?”

The word “approachable” is a descriptor for someone who is friendly, welcoming, and pleasant. What are some features of people who are “approachable”?

Research in behavioral psychology has shown that there is a fundamental motivation to approach environmental aspects that apparently confer benefit and a fundamental motivation to withdraw from those that are apparently harmful (Schneirla, 1959). Rotteveel & Phaf (2004) showed that the perception of happy expressions resulted in arm flexion, which has been associated with positive information (Rotteveel & Phaf, 2004). In layman’s terms, this literature can be summarized with a common interrogative from a wise great aunt, often directed at her great nephew as a child; In her thick Southern accent, she’d ask “Honey, why don’t you smile?”

The tendency to gravitate toward and away from certain facial demeanors is deeply ingrained in human nature. Even infants have been shown to gravitate toward their mothers when they are smiling, but not when they are frowning (Sorce et al., 1985). Assuming this primitive tendency is continuous throughout the human lifespan, it is certainly a worthwhile topic to cover in the pursuit of becoming more approachable to postsecondary students. Indeed, it has been suggested that smiles are useful in establishing and maintaining effective interpersonal relationships as they are indicators of trustworthiness and cooperative intent (Owren & Bachorowski, 2001). A more recent study showed that movement toward an approaching target was more likely when the target displayed a positive emotional state (Miles, 2009), thus supporting the rationale that there is an active primitive tendency to gravitate toward facial expressions perceived as positive.

Though initiating contact with a certain demeanor is a good starting point, please note that this is NOT a suggestion to *always* smile or put on any one set of “approachable” facades, but to rather consider them during interactions with people. For one, it is not inherent in everyone’s personality to always be cheerful or otherwise able to put themselves in a good mood on command. A cheerful demeanor can be forced to some extent, but human biochemistry is simply often not conducive to being in a good mood 24/7/365. Further, it could be perceived as “fake” by students. Worse, this might inadvertently lead a student to pursue academia under the false pretense that such a career is all positive.

As important as all of these things are, it must be recognized that cultural differences must also be considered and accounted for. What is perceived as “approachable” may very well differ from person to person based on their background. For example, one study showed that Chinese participants relied more on the eyes to represent facial expressions while Western Caucasians tended to rely more on the mouth and eyebrows, suggesting that cultural distinctions might indeed cause a misinterpretation of an emotional portrayal during cross-cultural communication (Jack et al., 2011). In short, advisors should take time to get to their students in order to put themselves in the position to facilitate an environment that best supports their educational pursuits.

Availability

A study cited earlier in this chapter noted that students tend to prefer advising centers over peer counselors largely because the students perceived peer counselors as not being either proactive or available when needed (Belcheir, 1999b). It has been further shown that committed, purposeful communication with an advisor is associated with increased student motivation and involvement (Astin, 1999). Fielstein (1987) showed that 28.9% of students, when interviewed about their advising experiences, noted that their advisor’s personal acquaintance with them was a high priority (Fielstein, 1987). Not surprisingly, research collectively suggests that students tend to be most pleased with faculty advisors who are available and accessible (Alexitch, 1997).

Access to and availability of faculty advisors is an area of concern as advising is an additional item on a plate already filled with quality teaching, research, committee work, outreach, and so on (Gnepp et al., 1980; Habley & Others, 1988). Complicating the issue is the fact that advising tends to be of low priority in tenure and promotion consideration processes (Habley & Others, 1988; Spencer et al., 1982). All of these things understandably culminate in reasonable faculty members simply NOT placing advising at the top of their priority lists. A 1987 ACT survey indicated that most faculty spent 1-5% of their time advising and that most faculty have contact with their advisees two or fewer times in an academic term (Habley & Others, 1988). Sadly, this is a disservice to the students, resulting in many institutes

of higher learning falling short of student expectations. Admittedly, one of the reasons for mentioning this seemingly obvious characteristic is based on personal conversations with students regarding their description of an ideal advisor. Almost all of them note some variation of “the advisor must be available” as the number one factor of importance in their assessment of advising.

A student whose advisor is not accessible is missing out on the wealth of information and experience that the faculty advisor *could* provide if they were available/accessible. For example, a faculty member can usually provide detailed information about courses, programs, and (cough cough) other professors. They can also provide a rationale for a requirement and point students toward otherwise unknown career opportunities (Habley & Others, 1988).

Education would be a far greater experience for students if only advisors who wanted to advise were allowed to serve in that capacity, and if those advisors were given some sort of relief of other duties to provide reasonable incentive for diligently serving in this highly important capacity.

An individual tasked with academic advising is highly encouraged to recall their importance in the students’ success and to do everything they can to take an interest in their students. This includes taking the time to strengthen their advising skills. Perhaps the most simple thing that can be done is to BE AVAILABLE. This is not saying that every hour outside of the classroom has to be spent in the office, but that there is merit in being proactive about this. Advisors should post and keep office hours, and bend over backward to make sure their advisees (and their students for that matter) know the schedule or can easily find it. Advisors should encourage advisees to drop by for an informal chat. One method I use is to keep a single-serve coffee maker in the office that students are always free to use; if the advisor isn’t available in person, they should provide some means for student access. If nothing else, simply checking email once an hour during regular business hours is helpful. Social media accounts can also be employed, for example by having a page set aside where students can interact with their advisor.

To take availability a step further, active mental availability should be considered in addition to physical availability. A former chemistry professor would literally sit in his office chair, facing the door, during office hours and do nothing else (maybe twiddle his thumbs) but wait for students to stop by. His students knew that he was there to *actively* listen, understand, and to provide feedback based on their needs because the sole purpose of his office

hours was not to catch up on work, watch videos on YouTube, or read a book for leisure, but to provide them help. The intention of this example is not to suggest that such extreme measures are necessary for everyone, but if a student is to be helped, their needs must be understood. If advisors are to understand the needs of their students, they must *actively* listen—listen in such a way that the student isn't just heard, but that they also feel heard, seen, and understood (Ranglund et al., 2017).

When a student visits an advisor in their office, that student should have the advisor's undivided attention until they can confidently leave with a solution or a plan for whatever the concern might have been.

Adaptability

Generally speaking, most approaches to teaching and advising can be categorized as “teacher-centered,” “student-centered,” or some combination of the two. This section will give some examples of advising strategies. As the shift is made to those descriptions, it is important to understand that all of these ideas (as well as others) should be in the “advising tool-belt” to be used or neglected as each occasion calls for it. However, the most important tool in the belt should be an adaptor that allows for the ability to adjust to the individual needs of the students.

A purist approach, in most any field, is likely to end in disaster. This will be a recurring theme in the coming sections. As highly adored as student-centered teaching (and advising) is, it is obvious that even these approaches require some aspect of teacher-centered guidance. If that were not so, teachers would be overpriced and obsolete relics of antiquity. Indeed, Dewey was somewhat critical of this approach in isolation (Dewey, 1938) as is a more recent article arguing that allowing students the absolute freedom to learn in an unguided environment is antithetical to the psychological principles encompassing working memory (Kirschener et al., 2006). This brings to memory an inspirational quotation: “The best teachers are those who show you where to look, but don't tell you what to see.” This quotation beautifully encompasses both sides of the teacher-/student-centered paradigm by serving as a reminder that teachers and advisors should be guides—coaches on the sidelines, but that as coaches, must be flexible enough to know not only where to look, but how to inspire students to look until they've found

the answer. If every student is unique in terms of experience, personality, and level of academic achievement (most are), this implies that an advisor must be limitlessly and existentially adaptable in order to inspire and motivate each individual student to press on towards the goal.

What Advisors Can Learn From Other Disciplines

Ascertaining and Admitting a Circle of Competence

The ability of a person to know what they don't know is arguably as important, if not more so, than what they do know. Being able to honestly divulge personal strengths and limitations falls under the category of personal competency and integrity. To some extent, this defines who a person is (Ranglund et al., 2017). Students are incredibly perceptive. With respect to advising, a former department chair at Averett University gave a piece of simple yet wise advice. He said, "If you don't know something, don't act like you do; they can see right through that. Tell them that you will find the answer and get back to them." This advice nicely parallels the concept of "circle of competence," which was originally intended as a principle of investing developed by Warren Buffet and Charlie Munger (Chairman/CEO and Vice Chairman of Berkshire Hathaway, respectively). The crux of the model is that everyone has the ability to make intelligent decisions in some area(s), but no one is an expert on everything (Parrish, 2013), and only people who are arrogant, foolish, or purposely deceptive pretend to be. As Charlie Munger put it, "A money manager with an IQ of 160 and thinks it's 180 will kill you. Going with a money manager with an IQ of 130 who thinks it is 125 could serve you well."

Munger's words could be adapted to derive an equally wise advising principle by replacing "money manager" with "academic advisor." This is true for several reasons, the most obvious being the plethora of elective courses (even at small liberal arts universities). Students have quite a bit of agency in exploring fringe interests as they pursue their primary goals (Thelin & Hirschy, 2009). This is great for students, and given the personal opportunity

to impart change, more choices would be advocated for. However, so many options pose a challenge for advisors. At some point advisors will need to be guided as they guide their students. Advising does not afford the option to quarantine in a niche circle of competence; advisors don't have the luxury of picking pitches; in fact, doing so would be antithetical to adaptability. However, they do have the responsibility to be open with their pupils about what they do and do not know. This is of paramount importance because transparent humility will foster trust in the advisor/advisee relationship. It is essential to develop a pattern of giving advice that advisees find to be trustworthy as this will foster the expectation that the given advice is always from an informed position. Because advisors do have a circle of competence, it is critical that advisees trust their advisors enough to know that professional remarks with respect to advice, feedback, criticism, commendations, etc., are credible and trustworthy.

More Than an Advisor: A Coach

To build on the coaching analogy, we will use pieces of a previously published coaching model for advising (McClellan & Moser, 2011). Thus far the importance of being available (physically and mentally), adaptable, and transparent about a circle of competence has been discussed. Together, application of these ideas builds rapport and assists the student to begin to both identify their own path to success and to devise a plan to achieve it. A good coach doesn't stop there, but intently watches so as to be able to evaluate the success (or lack thereof) of the plan. The coach offers feedback regarding the mishaps and helps to identify steps that aid the future direction towards success.

Evaluation of the success of the plan requires the advisor to pose questions that allow the students to reflect on their efforts (McClellan & Moser, 2011). Such questions help the advisor become more aware of the student's thought process; the answers might identify details of the situation of which the advisor might not have been previously aware, and should be considered as future directions are proposed (McClellan & Moser, 2011). Questions also serve as a means of assessment of the student's problem-solving ability (McClellan & Moser, 2011) thus directing the advisor to move toward a more "hands-on" or "hands-off" advising approach (Intrusive/Proactive Advising).

Considering future directions from which to attack a problem involves brainstorming. The advisor should be prepared to ask questions that encourage the activity. Though there are a number of questions that could be useful, one of particular personal appeal is, “If our positions were reversed, and you were offering me advice, what would you tell me?” Follow-up questions may similarly draw from what the student anticipates another involved party might recommend (McClellan & Moser, 2011). It is perfectly acceptable for the advisor to offer ideas as well, however, it is best to do so after the student has had an opportunity to think, so as to avoid intrusive advising. This is also to be done with humility: An advisor should not arrogantly insist or imply that their ideas are better than any others, but rather offer them as additional ideas that might be of value (McClellan & Moser, 2011).

Once several viable ideas have been presented, the coaching model of advising suggests that the advisor help the student evaluate and choose an approach to be molded into a plan with which to address the problems (McClellan & Moser, 2011). Finally, advising as a coach requires seeing the plan through. The student must be encouraged to stick to the plan and to give an account of their progress (McClellan & Moser, 2011).

More Than an Advisor: A Counselor

This chapter has alluded to the fact that advising entails much more than the academic milieu. With the personal development of students being dependent on advising to some extent, part of the time used to prepare for advising sessions should be spent considering that an advisor may be called upon to assist students with interpersonal relationships, personal challenges, work/life balance, co-curricular activities, and so on (Kuhn et al., 2006). Having served as an advisor for only a few years, I will attest to what more experienced advisors have noted for decades: Students often have complicated personal issues that, if left on their own, will be barriers to success (Kuhn et al., 2006). Any barrier to the success of the students is a barrier to the success of an advisor. Thus, the academic component of advising must happen in the context of advisees’ personal needs, values, goals, and circumstances (Kuhn et al., 2006).

Discernment can be aided by active listening skills, however, such challenges call for advisors to demonstrate empathy. That is, compassion must be shown in times of stress, the cause of which can vary greatly in its range of severity. Placing a high value on education tends to be accompanied by an innate concern about students, and as previously noted, active listening is an exemplary fruit of empathy. Actively listening to students' concerns (big or small) lends emotional support (Hybels & Weaver, n.d.). Emotional support as it pertains to extracurricular affairs can move perilously close to the line of most academic advisors' competency circles. While crossing the boundaries of certain competencies may not be particularly harmful, crossing this boundary can be. Most advisors are not mental health counselors. However, psychology literature suggests that empathy is associated with positive prognoses in therapeutic environments (Laska et al., 2014). Therefore, it stands to reason that empathetic listening, as the best source of outside help is deductively determined, can be helpful.

The focus of this section is clearly not as enjoyable as the rest of the chapter. However, the responsibility to help early career faculty brace themselves for an occasional encounter with a student who has a need in which they are unable and/or unqualified to intervene must be acknowledged. Indeed, there are scenarios that may very well surface in an advising meeting that should be referred to other campus resource offices including student success and/or counseling. The reader is encouraged to introduce themselves to the folks who work in these offices so that they are prepared to turn to them when situations arise that call for their expertise. Seeking help from another office (or another faculty member) is the advisor's responsibility. By seeking help, the discipline required of the advisor to admit her/his circle of competence is demonstrated as part of the fulfillment of duty to ensure that the students' personal and academic success is as attainable as it possibly can be. Kuhn et al. (2006) presents an excellent list of issues with which an advisor might be confronted along with an indicator that generally indicates whether the issue is addressable by most academic advisors (Figure 12.1).

Suggested Primary Responsibility Of: Advisor	Suggested Primary Responsibility Of: Either/Or	Suggested Primary Responsibility Of: Counselor/Other
<ul style="list-style-type: none"> • Selecting courses • Course registration • Course withdraw • Institutional withdraw • Degree requirements • Academic probation • Unfair grade 	<ul style="list-style-type: none"> • Death in family • Time management • Underachievement • Mid-life career change • Decision making • Academic goals • Personal goals • Career goals • Interpersonal relationships • Family relationships 	<ul style="list-style-type: none"> • ADHD • Substance abuse • Eating disorders • Physical abuse • Emotional abuse • Sexual orientation • Sexual harassment • Racial discrimination • Suicide

Figure 12.1 Categorization of responsibility in potential advising issues.

General Approaches to Advising

The purpose of this section is to describe some practical approaches to advising. To preface, it has been argued since the 1960s, by those conducting psychotherapy research, that the nature of the professional relationship, as opposed to any specific approach or technique, is most contributive to client satisfaction (Beutler et al., 1994; Rogers, 1992; Truax & Carkhuff, 1967). Thus, any of the following approaches to advising might be beneficial at some point. However, it suggested that these ideas be kept as tools in a toolkit to be deployed when the situation calls for it, and further, that these ideas be considered to exist on a sliding scale—that is, there are varying degrees of implementation. The approach taken and the degree to which it is taken will differ depending on the individual needs of the student. For instance, students may prefer aspects of either a developmental or prescriptive approach to advising so far as certain relational elements are demonstrated by the advisor (Mottarella et al., 2004).

Developmental Advising

Many advisees in science departments approach their advisors with an interest in pursuing careers in medicine. Thus, from this perspective, it would be remiss if the concept of osteopathic medicine weren't mentioned

somewhere in this chapter. A short justification clause for developmental advising seems to be the perfect place. Many people are not aware that there are two doctoral degrees in the United States that allow for full licensure to practice as a physician in any area of medicine. A Doctor of Osteopathic Medicine (DO) is trained to practice medicine from the perspective that the human body is a three-part being—an integrated whole comprised of mind, body, and spirit. It is often noted that a broken spirit can be every bit as painful as a broken bone. Further, a DO recognizes the paramount importance of the reciprocal relationship between structure and function and that wellbeing is often affected by factors outside of what is purely physical. This holistic approach to medicine is somewhat analogous to a holistic approach to advising that is developmental in nature. Developmental advising recognizes that the academic pursuits of the student can't be completely understood without seeing the whole student.

Together, developmental and prescriptive advising have historically dominated the field of advising (Barbuto et al., 2011; Crookston, 1972). Developmental advising is a controversial topic as the literature defines it in several different ways. Further, it has been criticized as aiming toward goals that are outside the realm of the traditionally held outcomes of higher education (Bloland et al., 1994; Hemwall & Trachte, 1999). Indeed, developmental advising is typically depicted as a model of counseling to the end of personal growth (Hemwall & Trachte, 2005). Though some academics are critical of such an approach, as this chapter has noted, this author believes that academic advising is far more than an occupation that promotes mere intellectual growth, but that intellectual growth is only achievable so long as personal growth is the cornerstone that supports the intellectual pursuit. Developmental advising supports this rationale as it allows advisors to embrace advising as a practice that recognizes students as multidimensional and should be supported emotionally, physically, morally, economically, and vocationally as well as intellectually (Boyle et al., 2012). Thus, despite criticism of the approach, developmental advising has been shown to be the ideal advising approach for university students (Gordon, 1994; Winston & Sandor, 1984).

To advise a student with such a goal, the student-advisor relationship should allow the advisor to pose questions whose answers will reveal the students' goals. To approach advising with a developmental focus, awareness of the students' current state is necessary (Grites, 2013). As mentioned earlier, it is helpful to note these goals on the inside of advising files so

that time can be taken to discuss progress during each meeting. These goals include those directly related to education, but also include career and personal goals (Winston et al., 1982). These broader goals might require a student to acquire a skill or seek professional experience outside of the institution.

Once those goals have been noted, advisors should help their students put together a plan of action that aims to accomplish these goals while promoting both intellectual and personal development. Keep in mind that the students may need the advisor to help find and use institutional, community, and perhaps personal resources to realize those goals (Winston & Sandor, 1984). It should also be understood by both parties that this is a shared commitment (Grites, 2013). The student must be honest and direct; the advisor must be tolerant and able to inspire; both student and advisor must be trustworthy, adaptable, and dependable (Grites, 2013).

The argument that developmental advising involves extracurricular factors, and falls outside the scope of most job descriptions is well taken. However, most educators have an intrinsic understanding of human dignity and the fact that their brothers and sisters of humanity are far from cookie-cutter and are incredibly complex. It is thus natural that a developmental approach would be at the core of every other practical or theoretical approach to academic advising.

Prescriptive Advising

Prescriptive advising is somewhat of a contrasting approach to developmental advising. While the latter recognizes the art of advising as a broad discipline that requires some degree of care for aspects of student life that go beyond academics, prescriptive advising mostly limits advising to matters that are directly related to academics. The advisor-advisee relationship in prescriptive advising has been compared to the physician-patient relationship in that the patient/student is given information necessary for progression of health/intellect (Barbuto et al., 2011). Such an approach uses advising sessions explicitly for course selection, registration, degree requirements, discussions of curriculum, and so on (Drake, 2011).

It has been noted that prescriptive advising is only a theoretical concept (Crookston, 1972). When considering the physician-patient relationship, it is nearly impossible to imagine the field of medicine without compassion, which by definition comes from some degree of personal concern. Regardless of whether it is ever practiced in the purest sense, the philosophy of prescriptive advising is incredibly important as the academic pursuits of students are at the heart of the student-advisor relationship. Service as an advisor requires accurate knowledge of the degree requirements (Crosbie, 2005) or at the very least, where to find them. While it is not typically in the nature of a teacher's heart to default to prescriptive advising, there are students who frankly want, and in some sense demand, prescriptive advising. Indeed, a recent study showed that 17 out of 429 surveyed students preferred prescriptive advising (Hale et al., 2009). While prescriptive advising is obviously not the most commonly preferred approach, it should always be kept in mind that different students find value in different advising techniques, and advisors should be ready to employ the technique that is most conducive to each student's success.

Burn Crookston's work (1972) provides an accurate depiction of prescriptive advising. Personal experience has shown that students who prefer this approach view their academic advisors as a source of information about the university. They want a cut-and-dried answer or plan to answer a question about an academic topic. A prescriptive advisor would hypothetically answer the specific questions, but would not address more comprehensive concerns (Crookston, 1972). To reiterate, such an approach is not the personal default, and the literature supports the rationale that pure prescriptive advising is not a viable option in the modern era (White, 2020).

Even students who seem to seek a prescriptive advising session should be challenged to at least be inwardly inquisitive about their own questions, and should be pressed to consider their rationale for certain questions. For example, if a student were to inquire about the process of adding a minor, changing a major, or enrolling in an elective that is outside of their field, the inquiry could be justifiably met with a question that is on the cutting-edge of advising: "Why?" While there is often solid reasoning for students to ask such questions, occasionally, a student has simply made a rash and/or illogical decision, and they need to be protected from themselves.

In this respect, while prescriptive advising might be the elemental approach for some students, it might be more appropriate to view such an advisor-advisee relationship as that between a client and a financial advisor.

Dave Ramsey, who is a radio personality specializing in personal finance, often says with respect to investing that “the only way to get hurt on a roller coaster is to jump off.” All three of the professions mentioned in this section (physician, financial advisor, academic advisor) call for a compassionate professional with genuine care for the success and well-being of those who are dependent on their advice. It would be next to impossible to ask a compassionate person to be so emotionally withdrawn as to allow someone under their care to jump off the metaphorical roller coaster without at least trying to prevent such a catastrophe. Thus, despite being mostly theoretical, this section addresses prescriptive advising as it entails some fundamental concepts at least and handful students will likely be encountered during the career of an advisor who need or prefer prescriptive direction. However, both the literature and personal experience suggest that it would be unwise (perhaps careless) to become a prescriptive purest.

Intrusive/Proactive Advising

Regardless of whether an approach is developmental, instructive, or a combination of the two, students might also be well-served by varying degrees of intrusiveness. Touted as a means of reaching at-risk students (Heisserer & Parette, 2002), intrusive advising involves proactively anticipating problems before they arise (Varney, 2007).

Natural inclination would be to divide this section into two by labeling one “hands-on advising” and the other “hands-off advising.” However, there is little to no literature discussing the effects of a purely “hands-off” approach to academic advising. And, to be clear, it is also well noted that intrusive/proactive advising should not be construed as “hand-holding” (Upcraft & Kramer, 1995). In fact, it is based on the idea that the advisor and student have shared responsibility for success. Thus, my personal contention is that most students require some balance of “hands-on” and “hands-off” advising; or as will be considered here, some degree of intrusiveness.

Truly “hands-on” advising would in essence be “hand-holding” as it would point out every possible roadblock, offer a set of instructions describing how to avoid/get around the roadblocks, and not allow a student to make a move that is likely to result in failure of any sort. Such an approach would likely be disadvantageous because it devalues the learning process by withholding

valuable teachable moments that strengthen character and discipline. In fact, being too intrusive can negatively affect a student's attitude toward advising, causing them to eschew help (Herget, 2017). The opposite extreme of this sort of advising would allow a student to encounter every problem on their own without any warning and then perhaps work with the student to solve the issues once they arise. This “hands-off” approach would also be problematic because there are some situations that are not so easily remedied.

Intrusive advising nicely balances these two ideas. That is, advisors should aim to be inviting, friendly, and warm while still implementing the touch of tough love that students need for optimal growth (Cannon, 2013). For example, as obvious as it might seem to you, many new college students aren't inclined to contact their advisors. Being aware of this common pitfall allows the advisor to avoid it by proactively making the initial contact with the students. This can be as simple as providing a personal introduction, briefly noting what is expected from the advisees and what the advisees should expect from their advisor (Cannon, 2013). The students might also be encouraged to reply with their own introduction (Cannon, 2013). It is also appropriate to ask the students if there is anything that the advisor should know about them and whether there is anything that they would like to know about the advisor.

To give an example of the balance between “hands-on” and “hands-off” advising that intrusive advising offers, consider advising a student with respect to course load. First, regardless of the ratio of “hands-on” to “hands-off” used, the importance of being prepared for advising appointments has already been noted. To reiterate, it is wise to use the prior afternoon to review any notes about the student and their grades, extracurricular activities, and personal situations. With that, the advisor should be prepared to pose questions that allow for some degree of intrusiveness. It is well-known that there is a bit of finesse to class scheduling, and varying degrees of intrusiveness can be used to help students avoid potential pitfalls.

Generally, a full-time course load can range from 12-18 credit hours. Information gathered from these intrusive questions can be used to offer students advice based on experience. For example, a student who holds a full-time job outside of school and has historically struggled academically might benefit more from a course load of about 12 hours whereas someone who has a history of academic excellence and has no job outside of school

might be able to handle a heavier course load. Perhaps it is also typical for students who take course X along with course Y to perform better or worse compared to those who take them separately.

A “hands-off” approach to advising would tell the students where to find the degree requirements, perhaps show them a sample 4-year schedule leading to degree completion, and have them select and enroll in classes on their own. The only intervention that a “hands-off” advisor might make would be to keep a student from taking a course for which they have not met a prerequisite. On the other hand, an exclusively intrusive advisor might go so far as to not approve a schedule that they believe to be less than optimal.

A perfect balance of intrusive advising as it is intended would provide students with all the information and warnings of historical areas of struggle, but still allow them to make their own decisions. With this approach, both the advisor and the student share the responsibility for success.

Concluding Remarks

I hope that you are now keenly aware that academic advising is a multifaceted art. Unfortunately, there is no one right way to advise students. There is no one right way to advise any “category” of students because every student has a unique set of life experiences, needs, priorities, and goals. If you are ever (un)fortunate enough to advise students at more than one institution, you’ll also find that advising differs quite drastically depending on the structure of the institution (e.g., community college, liberal arts schools, technological institutes).

Regardless of where you are in preparation for your first/next advising appointment, my advice to you is to be prepared to show your students how much you care. Take some time to get to know your advisees. Students have argued that interest in students’ personalities, recognition of their merits, and trust in them tend to contribute to the improvement of the advisor-advisee relationship, which translates to increased student satisfaction and subsequently to improvement in academic performance (Fielstein, 1989). Regardless of how well you know your advisees, observe them as multidimensional human beings (they are). Approaching advising with this

mindset will push you to be adaptable regarding the needs of your students. Perhaps most importantly, remember to be available to your students both physically and mentally.

I suggest that you spend some time in mental preparation for the fact that you will inevitably be called upon to coach students through problems—some of which are emotionally taxing to say the least. Regardless of the circumstances that arise in your world of advising, I hope that this work has encouraged you to reflect on your advising persona. Further, I hope that it has given you some ideas/tools that might be useful as you begin to master the exhilarating art of advising.

Finally, I implore you to not be afraid of advising. With confidence and a spirit of humility, embrace it, enjoy it, and rest assured that you are very much up to the task.

Reflection Questions

- What personal changes could you make to improve advising quality?
- Does the physical and emotional environment in which you advise inspire trust in the advisor/advisee relationship? What steps can you take to improve this?
- Without considering any particular student, what advising approach(es) are you most likely to implement?
- Despite your tendency to gravitate towards certain approaches to advising, what steps might you take to embrace methods that are outside your comfort zone?

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Figure and Table Attributions

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13. Engaging the Fear: How to Utilize Student Evaluations, Accept Feedback, and Further Teaching Practice

COURTNEY VENGRIN

Introduction

While nearly every campus and class conduct evaluations of teaching in some capacity, the effect and use of these evaluations vary widely. The majority of these evaluations are done at the end of the semester, and if any changes are made, these only impact future students. This feedback is also difficult for faculty to digest. It can be scary and uncomfortable to “look under the hood” and see what is working and what is going wrong. Furthermore, these evaluations are often discussed in high-stakes contexts, such as annual reviews. In this chapter, we dissect the evaluation of the teaching process and ask critical questions: Are these evaluations helping us become better educators? How are these data used? Is this process equitable for students and instructors? How should evaluations be framed? Should students be trained? What about the mid-semester evaluation process? Are there other options? What improvements can we make?

How to cite this book chapter:

Vengrin, C. 2022. Engaging the Fear: How to Utilize Student Evaluations, Accept Feedback, and Further Teaching Practice. In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.

Teaching evaluations are useful but have to be structured, reviewed, and administered in the appropriate context to garner maximum value both for the time of the educator and of the student. The research will be discussed on both end-of-the-semester and mid semester evaluation processes. A variety of instruments and approaches will be presented, and an outline for training students will be included.

This chapter will discuss...

- The history of student evaluations of teaching
- The collection process for student evaluation data
- How to create a plan for utilizing your student evaluation data

History of Student Evaluation of Teaching (SETs)

The methods by which we determine what “good teaching” looks like have been the topic of much debate for almost as long as the field of education has existed. As such, there are a multitude of techniques for evaluating the effectiveness of one’s teaching, ranging from peer evaluations and committee reviews to the Student Evaluation of Teaching (SET). Teaching evaluations take many forms throughout K-12 and higher education classrooms and are often used to determine improvements to be made and even in discussing promotion and advancement (Dodeen, 2013). One of the most common metrics by which teaching is judged is the SET.

Much of the current literature discusses appropriate use of the SET, but there is not one clear, uniform means by which to assess and utilize student evaluations of teaching (Braga et al., 2014; Dodeen, 2013). Traditional

evaluations of teaching are often done at the end of the semester, collected, and left unread until an official review by administration or other outside impetus forces us to confront how our students felt. It's all too easy to put reading and reflecting on these evaluations off as we typically get the information near holiday or summer break. We have other things to do, family to see, grants to write. Additionally, we question the usefulness of these evaluations, wondering, for example, whether it is just a popularity contest. Students also question how these evaluations are used, if at all (Brown, 2008).

In addition to the traditional end of semester SET, mid semester evaluations are a burgeoning topic in higher education. Through using a mid semester evaluation faculty are able to make adjustments to teaching practice to better address current student needs and thereby provide a better educational experience (Blash et al., 2018). Quality teaching means constant improvement. This improvement should not just come at the end of the semester but can and should be a continual process of reflection.

Finally, we would be remiss to not acknowledge the place of equity in the subjective nature of student evaluations of teaching. Research has shown that SETs tend to favor the white male instructor archetype (Boring, 2017; Dodeen, 2013). One study in particular used an online class where students did not have face to face time with the instructor but were given an instructor name that sounded either traditionally female or male (MacNeill et al., 2015). The course content was identical but the (presumably) male instructor received higher ratings. Female-presenting instructors are also more likely to get comments on their appearance than male presenting instructors.

Any subjective measure is open to implicit bias. Causes of bias also vary widely, from implicit bias to bias stemming from an expected grade (Boring, 2017; Nasser-Abu Alhija, 2017). We must recognize that these measures are imperfect and utilize the data accordingly. The appropriate use of SET data is discussed further later in this chapter, taking into account these factors of bias. We will also review some potential methods of mitigating bias in SETs.

Collecting SETs

Almost every institution uses some form of teaching evaluation. These processes are often driven by a top-down approach, resulting in less-than-ideal feedback for the instructor. As a new instructor, a good practice is to look into the form or forms available, understand the process, and see what options exist. Are you able to add additional questions? Are there department-specific questions? What is the review process like for these forms? Can you conduct your own “off cycle” evaluation? Become involved in the process so that you can advocate for evaluations that will benefit your teaching and your students.

Understanding the form, knowing what questions are on it, knowing the timing of when it will be available to students, when you as an instructor receive the results, and who receives the results are all important. In some cases, departments or colleges may limit the number of evaluations or who is evaluated. For example, if you are a veterinary faculty member specializing in dentistry, you may only guest lecture two hours all semester with the rest of your teaching done in a clinical setting. In some cases, due to the survey burden, there may be rules in place that say instructors with fewer than five hours of teaching time are not evaluated. Or perhaps you are a graduate student doing some guest lecturing; you only have one hour of teaching time, but you need evaluations of your teaching to add to your job packet for future employment. Seek out assistance from departments to see if exceptions can be made. Additionally, with “off cycle” evaluations, it is important to know the timing. If you guest lecture in the third week of the course but the evaluations do not become available to students until week 12, they are likely to not remember you well, and are therefore more likely to give inaccurate information.

While nearly every campus and class conduct evaluations of teaching in some capacity, the effect and use of these evaluations varies widely. Most of these evaluations are done at the end of the semester and if any changes are made in the teaching, these only impact future students. Mid-semester evaluations offer an alternative. By “taking the temperature” of a class at the midpoint of the semester, faculty are able to check in and see what students are enjoying and what changes may need to be made. Students also respond positively to the use of mid-semester evaluations given that they can directly benefit from the results and are therefore more inclined to respond to the

evaluation whereas at the end of the semester they are more apt to skip the survey, get their grade, and head on to the next course (Brown, 2008; Frick et al., 2009). Providing assessment and feedback opportunities during a course rather than at the end, students are given the power to advocate for their own educational experiences and faculty are more empowered to make changes to better the educational environment for all involved.

Engaging with SET Data

Once we have collected some form of SET data, either through our own means or that of external forces, the next step is to engage with our data. Half the time it will sit there for a long while, ignored as we go into the summer holiday or summer research venue. But eventually you have to look at it.

Engaging with our feedback data as part of reflexive teaching practice is one of the most beneficial things we can do, but it is often one of the most difficult. Looking at our evaluations and feedback often brings up feelings of judgement, apprehension, and inadequacy. To push past this discomfort, it is important to remember that the data are not there to sit in judgement of you. It's there to help you. It's there for you to respond to as well. No, not directly to those students, but to the next class, in most cases. Your response comes in the changes you make, the ways you continue to improve over the course of your career. Sometimes the feedback is painful. Sometimes it's funny. Sometimes it could be more constructive, but it's feedback, nonetheless. It's an assessment. And those data need to be used. Not just by administration and end of semester reports, but by you. How will you respond? How will you use YOUR data?

Sometimes, ripping off the Band-Aid is the best approach. Just sit down with a strong cup of coffee and skim through it. You may be surprised. Often, you will find at least one compliment or positive note to move forward with. Sometimes it's even just a simple "Thank you" that helps us feel appreciated. Find those and hold on to them.

We know that if given no incentive, typically the most satisfied and most dissatisfied individuals respond to evaluations. They love you or they hate you. So don't go in expecting all sunshine and daisies. Expect to get feedback that is less than pleasant and know that you have room to improve. We all do.

When scoring SETs, especially at the departmental or program level, ranking is not advised (Sachs & Parsell, 2014; Schmelkin et al., 1997). This includes ranking within a course for which you are instructor in charge. The scores are typically on a Likert scale and when these scores are reported to faculty, typically they have been mean scored, which in some recommendations is inappropriate for Likert-scaled items. To further extrapolate this score into a ranking is not appropriate. Furthermore, ranking employees, faculty, or staff in general lowers morale and is inadvisable (Sachs & Parsell, 2014). Additionally, it is important to recall the bias present in SETs when reviewing these as a department or program review. Given these issues with SETs, the data gathered from these subjective measures are most useful as formative feedback for the instructor and course, and not for making personnel- or department-related decisions.

However, scores, even those that are mean scored, can be useful if we first work to understand the score in context. What was going on during this time? What occurred this semester? Were there any abnormalities or issues that arose? Were there any large-scale world or campus events that may have impacted students? What bias may be present within the data? Additionally, how was the SET distributed? Was it available for a long period of time, or a short time period? Was it discussed in class or only sent out via link? Research indicates that all of these variables can impact the score. In one article, the weather significantly impacted the teaching effectiveness scores (Braga et al., 2014).

Moving past the somewhat arbitrary score, the bulk of the SET tends to be in the nebulous comments section. The comments can be the most daunting and analytically confusing section for individuals to engage with, given that students' responses vary widely from constructive feedback to inappropriate comments on appearance. So how do you examine the comments?

There are two methods for examining the comments: in-depth analysis, and a surface-level view. The end use of the insight gained should be considered when determining which approach to take. Did you try something new with students and want to see how it went? Was there a specific question about a portion of your teaching that you added to the

evaluation form? What level of data would be most useful for your purposes? Answering these questions will help determine how to go about breaking down the comment section.

Surface analysis

In order to do a surface analysis, all you will need to do is a quick read-through of each comment. See where the majority of student opinion is falling. Get a blank piece of paper (or spreadsheet) and divide it in three columns labeled “theme,” “positive,” and “negative.” Do a quick scan of the comments. Read each one and write the general theme down in the first column, and then place a check or tally mark for either positive or negative. Each time you come across the same theme, add a new mark in that theme’s section. Create new themes as you go through the comments. Using this method, it should not take very long to paint a concise picture of what is going well and what changes you may want to make. See table 13.1 for an example.

Table 13.1 Example of comment analysis.

Comment	Code
Not give as much time for questions.	Pace & Timing
She was very enthusiastic and eager to improve my education. She also presented the material in a way that was accessible to me.	Engagement
Overall, the instructor did a great job. She was very passionate and knowledgeable about the material which made learning more interesting and enjoyable.	Engagement
The PowerPoints were hard to follow. The font was too small from where I was sitting	PowerPoints
You talk really fast sometimes and it was hard for me to keep up as English is not my first language.	Pace & Timing

In-depth analysis

In some cases, an in-depth analysis will be more useful. You may be just starting out in your teaching career and want to better understand how things are going, or maybe you tried a new technique like flipped classroom and want to use the feedback to decide if changes are needed. Similar to the surface analysis, you can create an Excel spreadsheet of your comments. Often, you can get the comments already loaded into Excel from your evaluation software or the entity that does the evaluation data collection. Mirroring the technique of the surface analysis, you will create additional columns beside the comment column—however instead of positive and negative, you will create two to three theme categories. Often, there are lengthy comments that address several elements, so use a column for each theme. As you read through your comments, note the themes. Once you have completed this, use Excel’s “sort” function and sort the themes alphabetically. You can then create summaries of all the comments in that theme and determine what is working well and what you may need to change. Make additional notes on which areas you want to focus on moving forward. It is sometimes useful to do an additional calculation of the percentages of the themes, thereby quantifying the data for further review. In doing this you may find that 40% of students commented that the pace of the course was too slow, while 10% found it too fast. See what changes can be made and save this file for comparison against your next SET. This can be useful in your annual review as metrics of your efforts and changes made to better your teaching practice.

However, when engaging with this process, remember to take all the feedback with a grain of salt. Not just the bad parts, but the good, too. You may be perfect in one student’s eyes, the one who got an A, loves the discipline, knew you from another class, and thinks you walk on water. But are you really all that that student makes you out to be? No. And are you really a horrible, terrible, mean, imbecile like the other student said? Also no. Where are you? Probably in between. So be humble and self-reflective. Know that you aren’t perfect but know that by reading and analyzing your feedback, you can make your teaching practice better. Remember that it’s your data. The assessment of your efforts (*but not of you as a person, remember that*). So, use it to your advantage.

Using SET Data

There are several ways you can use your SET data once you've gone over it. One potential option is to add it to your teaching portfolio, as a way to add detail to your teaching effectiveness. You can use your SET data in the form of summarized student evaluations of teaching, including response rate and relationship to departmental average. You may also want to include a select number of written comments from students on class evaluations. To supplement these, you can also include comments from a peer observer or a colleague teaching the same course.

Another use of your SET data is for course improvement. This will take some additional searching and analysis to determine what data you have access to. Many institutions use two forms of evaluations, a teaching evaluation and a course evaluation. If you are the lead instructor for the course, you most likely will receive both. However, if you are a secondary instructor within the course, you may not receive the course evaluation. It would be a good idea to reach out to the lead instructor to ask if you might see the course-level data. Sometimes this data will need to be amended to remove comments about other faculty members. Once you have access to these data you can analyze them for the comments regarding your teaching as well as the comments regarding the course structure. What changes can you make? What are reasonable suggestions? What worked well? These data also serve as a great opportunity to demonstrate to future students that you are listening! You may wish to take a few comments and add them to your syllabus or go over them on the first day of class and let students know about the changes you have made based on last year's class comments. Remember, this is YOUR data to help you improve your teaching as well as your course. Use it! Don't just let it go to waste!

A final use for this evaluation data is as a component of an overarching programmatic improvement. This will often be at the department or college level. The process for this involves reviewing the data as a whole. As stated earlier, this department-level review process should not rely solely on data from SETs, but should provide a full picture of the program, including interviews, observations, and document analysis. Once the data are collected, areas for improvement can be pinpointed, much the same as with a smaller, classroom-level evaluation. Once these areas are identified, leadership should meet with teaching teams as well as individuals to discuss

the findings and agree upon a forward direction. If done correctly, this should be a positive experience. Evaluations and evaluation data should not be used to punish or shame departments, programs, or individuals.

Conclusion

In summary, remember that your SET data are just that, yours! You can use it to help you improve your teaching, your course, and your department. As with all subjective measures, not all of your evaluators will agree. Find the evaluation comments and sections that you feel are the most true and applicable for your teaching. Harness your data and make improvements where you can. Never stop growing as an educator!

Reflection Questions

- How can you make better use of your SET data?
- If you could ask your former students for feedback on any one thing related to your teaching, what would it be?
- What parts of your current SET process are working well for you? Which parts could be improved?

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VIGNETTE: So You've Landed the Job... (or Surviving Your First Semester)

LAURA HANZLY

During my last semester at Virginia Tech, I was instructor for a course I had helped teach as either co-instructor or Teaching Assistant for the past two years. Three months later I would be at a brand-new university and the instructor for two courses that were completely new to me. My time at VT had lulled me into a false sense of confidence and security in my teaching; I knew my lessons plans front and back and by the time I was instructor of record I also knew what wouldn't work in the classroom. This was in stark contrast to my first semester as a newly hired lecturer fresh out of graduate school. I had almost no time to plan lessons before the semester began, was unfamiliar with the courses I was teaching, and most importantly had to find a way to deal with the realization I had no way of knowing what would and wouldn't work for my courses.

To help deal with these feelings of being overwhelmed and imposter syndrome that may come with your first semester of teaching, I found mid-semester course evaluations vitally important. I already knew the benefits of mid-semester evaluations in terms of students having a voice in the classroom and feedback for teaching style and course design, but I did not realize how hearing students' feedback would instantly reduce my imposter syndrome feelings and eliminate my constant second guessing of the lesson plans I created.

How to cite this vignette:

Hanzly, L. 2022. So You've Landed the Job... (or Surviving Your First Semester). In: Westfall-Rudd, D., Vengrin, C., and Elliott-Engel, J. (eds.) *Teaching in the University: Learning from Graduate Students and Early-Career Faculty*. Blacksburg: Virginia Tech College of Agriculture and Life Sciences. <https://doi.org/10.21061/universityteaching>. License: CC BY-NC 4.0.