Northeastern
Center for Advancing Teaching
and Learning Through Research

The Scholarship of Teaching and Learning

Essays by the 2019-20 Teaching and Learning Scholars

About the Teaching and Learning Scholars Program

Northeastern University's Teaching and Learning Scholars program supports educators as they engage in deep investigation of their students' learning experiences, the concepts and assumptions of their disciplines, and the body of scholarly work that is relevant to their teaching practice. Scholars meet regularly throughout the academic year to surface and refine their questions about teaching and learning. As a community, they also share ideas and receive feedback on plans for an intentional investigation of their students' learning.

All of this work culminates in a Scholarship of Teaching and Learning (SoTL) project, which is a systematic, evidence-based study related to student learning. This project could be a close examination of a specific aspect of a course, a structured investigation of a particular teaching approach, or experimentation with new methods.

For most Northeastern educators, involvement in scholarly teaching began long before their application to the Teaching and Learning Scholars program. For example, they attended inquiry groups and workshops offered by the Center for Advancing Teaching and Learning Through Research (CATLR). In addition, CATLR recommends participating in the year-long Teaching Inquiry Fellows program prior to applying to become a Scholar, as it provides a strong foundation in scholarly teaching concepts and processes.

For more information about the Teaching and Learning Scholars program, contact catlr@northeastern.edu.

INTRODUCTION

Scholarship of Teaching and Learning: The Pandemic Year

The Scholarship of Teaching and Learning is an inherently iterative process of inquiry into student learning that often unfolds with unexpected twists and turns. There is an opportunity to transform thorny problems or perplexing experiences into curiosities, questions about student learning that can be systematically investigated. Things are not always as they seem at the outset, and we often change our plans for teaching as part of the process.

In the 2020 nothing went as planned within higher education, and that makes the work of this group of Scholars all the more admirable. Some typical challenges associated with teaching were amplified, such as fostering student engagement and motivation. Other less visible challenges were brought into stark relief, such as unequal access and student mental health needs.

Placing the work of the 2020 Scholars in this larger societal context helps underscore the importance of their work. John Sangster integrated an exercise into his course that helped him better understand the impact of COVID-19 on the perspectives of his students and use that information to better support student well-being. Bret Keeling, who originally intended to focus on cultivating an awareness of what it means to care through service-learning and writing projects, extended his work to consider the impact of events such as the killing of George Floyd on how students articulate their conceptualization of "care." The value of Anne van de Ven-Moloney's research on virtual labs, well underway for several years, became increasingly apparent as we reconsidered the types of learning that are possible to accomplish online. And finally, as entire institutions developed emergency responses to assessment, for example by switching to pass/fail in the spring, David Tamés experimented with specification grading as a means for focusing his learners' attention on feedback and iterative improvement. This approach to assessment strengthens both educator and learner awareness of alignment between coursework and learning outcomes.

We hope you enjoy reading about these projects as much as we enjoyed watching them develop. These Scholars rose to the occasion during one of the wildest rides in the history of higher education!

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Caring About and Caring For: Thinking and Writing *Care*

As a teacher of writing, I'm familiar with the long history within Writing Studies to listen to (and, even, to listen *for*) students' lived experiences. Eodice et al. (2016) have argued that in order for writing to be meaningful to students, faculty should:

> "…set assignment parameters with enough student choice and enough encouragement of student agency that students may choose to take up the invitation, and, if allowed and further encouraged, will bring the power of personal connection, future relevance, and deep immersion to what they're thinking, writing, and researching" (p. 133).

Seven years ago, I began integrating service-learning with all of my First-Year Writing courses not only so that first-year students could expand their lived experiences but also so that they could learn about the lived experiences of others. Over time, though, I became increasingly concerned not so much with how my students might be meeting the needs of our community partners but, instead, with how my students might (or might not) be meeting the needs of our community partners' clients. I asked myself (often): How do our community partners' clients know that we care about them—that we care about them not just as "components" of a 14-week learning experience but, more importantly, that we care about them as fellow human beings?

The above marks, albeit briefly and over-simply, the critical moment (Laws, 2020) where I began the current research project—that place where, as Ciccone (2018) describes it, "teaching and learning 'problems' become research 'opportunities' as our curiosity transforms perplexity into interesting and consequential questions" (p. 15).

Articulating my own question, however, has proven to be elusive and, even now, seems tenuous. As you can see from the image below (Figure 1), which represents my first attempt to get at a "consequential" research question, I initially intended to focus on the relationship of service-learning to my writing courses:

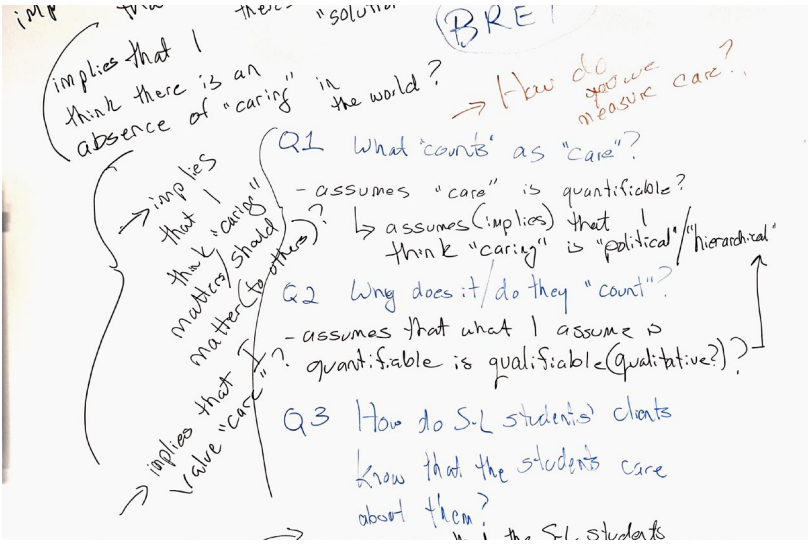

Figure 1. Author notes from an activity called "Unpacking Our Assumptions."

But over the progression of meetings and conversations, I realized that what I "care about" and what I "care for" (Tronto, 2015) extend beyond integrating service-learning into the classroom. I care about and care for *caring*. So, my original questions have evolved into what I'm tentatively describing as a concern—maybe a "curiosity"—about *care* as *practice*. And to begin to get at that concern, I'm currently (perhaps, even, provisionally) focusing on the following research question: *What kinds of writing projects help students cultivate an awareness of what it means to care?*

Perhaps I can identify—and develop—the kinds of writing projects that give students choices in focuses and that offer students encouragement to pursue topics that have personal (past, present, future) relevance. Then, students will care more not only about *what* they think and write but also about *why* they think and write it. And it's my hope that creating a way to get at the "why" will provide a point of entry for a fuller exploration of *care as practice*.

To attempt to answer my research question, this study uses data from two previous semesters:

1. ENGW 3302: Advanced Writing in the Technical Disciplines
   May 2020 through June 2020
2. ENGW 3315: Interdisciplinary Advanced Writing
   July 2020 through August 2020

The data comes from the students' final Learning Letters. The Learning Letter, as a final project in my classes, provides an opportunity for students—for learners—to share with me aspects of their learning that a "final paper"—in and of itself—can't convey. A Learning Letter can become a tool students use to discover that some "learning" has taken place that my assessment of their work may not be taking into account. Writers of effective Learning Letters explain their recognition of the ways their efforts on a particular sequence of assignments has meaning for them beyond the confines of that sequence. The meaning students discover or come to recognize may be personal and relate to feelings of accomplishment about the completion of a project. And that meaning may be more public and relate to discipline-specific focuses or to meeting global and societal needs.

I chose these two courses as the focus of this project for two reasons. First, while the final Learning Letter project required that students from both courses discuss their three previous projects in the context of both caring and civic engagement, the three previous projects had differed in the genres I assigned students to engage. Because of these *differences*, I hope to determine, through a process of descriptive coding (Saldaña, 2009) and grounded theoretical development (Glaser, 1978), which (if any) assignment (or genre) lends itself to encouraging an awareness of what it means to care.

Second, I chose these two courses as the focus of my research project because students in both Advanced Writing in the Technical Disciplines and Interdisciplinary Advanced Writing completed the courses in the midst of shared local, national, and global crises. For example, students in both courses began their work during the COVID-19 pandemic and the consequent economic catastrophe. The students in Advanced Writing in the Technical Disciplines were completing work for their course simultaneous to the George Floyd protests that began on May 26, 2020. Students in Interdisciplinary Advanced Writing were completing work for their course simultaneous to protests associated with the one-year anniversary of the shooting and killing of De'Von Bailey and the shooting and paralysis of Jacob Blake. Because of these *similarities*, I hoped to determine what (if any) impact these crises may have on the ways students articulate their awareness of what it means to care.

Coding of the students' final Learning Letters is still ongoing, with preliminary findings beginning to emerge (Table 1). Saldaña (2009) explains that "[a] code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (p. 3). To date, I've identified a

number of short-phrase "descriptive codes" based on a first-cycle reading of the students' work (p. 35):

Descriptive codes: Students articulate an awareness of what it means to care
Being open-minded
Showing commitment
Practicing activism
Practicing advocacy
Taking action
Meeting the needs of others
Focusing on evidence
Showing either empathy or sympathy
Showing both empathy and sympathy

Table 1. Preliminary codes developed through thematic analysis of study data.

Working with these (and, likely, additional) descriptive codes will, I hope, enable me not only to summarize the data but also to appreciate and interpret the significance of those summaries as they relate to students' awareness of what it means to care. Saldaña (2009) encourages writers of qualitative research projects to remain focused "on your a priori [determined beforehand] articulated research questions, purposes, and goals" in order to "keep you on track with the project" (p. 35). But he also reminds us that "personal or ethical dilemmas ... of varying magnitude arise in virtually every study with human participants"—problems based, at times, on "what the researcher observes in the field that counters her value, attitude, and belief systems [sic]" (p. 38). At this point, I'm not sure that I've fully identified, assessed, or resolved these potential "ethical dilemmas" as they relate to my beliefs, attitude, and value systems.

For that reason, following the lead of Hutchings (2000), I continue to approach this research project "at its opening, if you will, rather than its closing stage" (p. 2). This project has raised—continues to raise—new questions for me—questions that extend beyond the boundaries of my project. But these questions underscore, for me, what I hope is the value of my project as it expands in the months and years to come. Whatever conclusions I ultimately make after I finish coding and analyzing my current

data will be "emerging" and "preliminary." And that's because my research question about "caring" only partially seems to rub against my larger concern about the potential for the ways students' sense of personal connection to their work can provide a path toward *care as practice*.

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Catching Students Before Freefall: Mitigating the Transition to Higher Education in Precedented and Unprecedented Times

At 18, I didn't have either the life experience or the maturity to recognize how depression was impacting my behaviors. In the spring semester of my first year of college, I initially stopped attending classes and doing homework, then I stopped socializing and leaving my room, and finally, I stopped eating. I returned home weighing 125 pounds, while earning a 1.9 GPA, and barely scraping by enough to stay enrolled in college. In the 20-plus years since then, my professional life reads like a short story written by a middle-schooler who was told that plot twists keep an audience interested. I now find myself full circle, on the other side of the desk, teaching first-year engineering students and trying to support them on their journeys.

I've gone on many explorations through the literature and my own thoughts in the past decade, trying to understand not just what teaching tools are in my toolbox, but more fundamentally how to support students who are encountering difficulties similar to what I experienced. What could I, as faculty, do to aid my students in this transition to this chapter of their lives, to prevent the free fall I so narrowly escaped?

This concern stems from two key ideas within my practice as faculty. The first is that curriculum design, as expressed in the structure of my lectures and assignments, is inextricably tied to student learning outcomes, and that small modifications to these can have a large impact. The second is that students are autonomous beings, with their own strengths, goals, and ways of being, that influence not only their performance in my class, but every aspect of their lives.

My beliefs about curriculum design are most heavily influenced by Lang's *Small Teaching* (2016), which taught me that the continuous evolution of a course can be driven by small, incremental changes that add up to large increases in student learning outcomes. Over time, I have integrated some of Lang's ideas, and have seen improvements to student comprehension and comfort with difficult content. For example, "previewing" is the idea that students can prepare their brains for new information by thinking about all of their prior knowledge related to that information, metaphorically making space in their network of knowledge for that new information to live. I start

each class with a "thought of the day" that sparks a few minutes of discussion about the topic we're about to learn—a small modification that has allowed me to better perceive how my students are orienting to the subject matter, and to recognize any conceptual roadblocks that may be standing in their way. This relates to the second element of my practice referred to above: student agency.

My perspective on student agency has evolved in my time as faculty. I now view my responsibility as learning more about what factors might be complicating my students' ability to learn, but also helping students become self-reflective about their own journeys to help them take control of their own destiny. This realization led me to explore ways to equitably meet the needs of all students through differentiated curriculum (Verschelden, 2017), with focuses on neurodiversity and differences in background knowledge. In practice, I began incorporating reflective writing assignments (Tolman et al., 2016) early in the semester that scaffold student processing of their own experiences with faculty, and how this impacts their willingness to learn. But what else could I integrate into my practice to provide a rich engineering experience for every student in my classroom that supported their growth and learning?

Figure 1. Discussing food deserts with students at the Fenway Victory Gardens in Boston, MA.

The influence of these ideas surrounding differentiated curriculum and reflection came into stark relief in the second week of March 2020 when COVID-19 shut down the campus, and distance classes were largely asynchronous. Most students handled the transition without a problem, but I had four students out of around 100 who went from B's to F's in the space of a month, and who were largely unresponsive to any form of communication from me.

We faculty now had a new challenge: working to mitigate outside factors and ensure student access and success in our classrooms. How could the insights described above inform my practice within the landscape of COVID-19?

As the fall semester approached and we learned more about the learning models we would be applying for flexible/hybrid teaching, my concern grew about the potential for more students to get lost in remote learning. Thinking back on Verschelden's *Bandwidth Recovery* (2017), I anticipated a lot of my students' mental load being taken up by financial and health concerns. Many conversations were had with other faculty about the ways we anticipated students would be struggling, but it was all based on supposition. Connecting the two elements of practice mentioned above, I decided to (1) survey students before the start of school about their perceived preferences for housing and instruction, and (2) ask them to write a personal narrative about how COVID-19 had impacted their lives in the previous six months.

The results of the August survey (100 out of 135 students responding) provided some initial insights regarding student perceptions entering into college, and their motivations for attending Northeastern. Among those responding, 57 indicated that Northeastern's decision to hold classes in-person was a major factor in deciding to enroll, and 70 of them felt that they would learn better with an in-person instructor. In addition to our concern for student safety in the pandemic, we faculty faced new external stressors, with some faculty being older and more at risk for complications from COVID-19, and other faculty having young children with schools and day care facilities all shut down. When asked about reasons for some faculty to not be in the classroom, 83 supported remote teaching for older faculty who were more at risk, while only 58 supported remote teaching for faculty with young children at home and no access to childcare. These responses drove my decision to teach on campus in the fall, leaving my three children, aged 12, 10, and 8, at home unsupervised while they took their own classes remotely. Though difficult in its own right, this move yielded deep insights regarding student experiences and the impacts of COVID-19 in our narrative self-reflection assignment.

I paired the COVID-19 impacts narrative with my usual assignment inspired by Tolman et al. (2016) of their reflection on themselves as learners. I wanted to give my students an opportunity to process their experience with COVID-19 and to reflect on how, if at all, they thought it might impact their ability to learn this semester. I requested that each student spend an hour writing about their personal experiences, and that anyone could ask to be exempt from the assignment. For an introduction to engineering course, this writing assignment was somewhat off-topic, and I explained my reasoning to the students for the assignment. I shared with them my own struggles from my first year in school, and how it took a long time to recover, but more importantly how no one knew what I was going through, and I didn't have any help. I wanted my students to try and put into words their own experience, to connect them with resources if they needed help in the short term, and to build connections so they felt safe reaching out to me in the future if they needed to.

My students shared stories of how they grew closer to their families, or suffered from depression, lost a grandparent, or spent time learning a new skill—the same wide-ranging experiences that all students experience all the time, just heightened and condensed in the face of COVID-19. As academics, we're used to converting qualitative information into quantitative, but these numbers fall so completely short of explaining what my students have been through, that I would rather share with you some excerpts from their narratives, both the highs and the lows, and leave you with their words as we all move forward together in figuring out this new existence. What did they say, and how, as faculty, can we respond?

This, in their words, is how some of my students were impacted by COVID-19 in the past year, as written during the first week of their first semester of university, in the fall of 2020.

> "I still remember a normal Thursday after school when I was complaining that a neighboring school district had Friday off due to Covid. I remember the joy I felt going home that evening and hearing that school was cancelled to the weekend."
>
> "I didn't want it to end like that, like some unfinished story."
>
> "... there was something uniquely blissful about having nothing to care about… and watching YouTube videos and playing games with my friends while the world descended into madness around me."

"... it was honestly one of the hardest times to actually get out of bed and start my day of nothing and find something my parents deemed as productive to fill it. I endured a lot of criticism from them and they ended up just piling tasks on top of me so they would not feel guilt themselves that I was not being productive."

"[I] confided in my friends and many of them were going through the same challenges as me, and we decided to regularly have group calls to help comfort each other in those tedious times."

"I have not had any real family time in a long time and I feel like Covid blessed me with that opportunity."

"This sense of sadness, loneliness, and emptiness was completely new to me, and I didn't really know how to cope."

"In August, my parents told me that they didn't want me to go to campus this semester, after I had assumed the entire time that I would be going and that it would be my decision about whether I would or not go."

"Mostly right now I'm just grateful to have something to do. I've always liked school, to a certain extent, and I am excited to be in classes again, as well as to just be busy in general."

"The hardest part about COVID for me has just been being lonely. Being isolated for such a long period of time was difficult for me. I had been struggling with depression for the last year and having all that time by myself was difficult."

"... I also had time for myself, to think about myself, my plans for the future, and my goals."

"Both my [parents] lost their jobs due to Covid, causing my family to be more financially unstable than previously... [they] decided it would be best for the family to take out student loans in my name for the full amount of tuition."

"During my first week moving in, I had a hard time remembering what it was like to meet new people. All of us did not know what questions to ask, or how to make each other feel comfortable enough to develop friendships."

> "The anxious idea that someone I care about could contract Covid is something that is constantly in the back of my mind."
>
> "Even now, as I sit in my dorm with 5 negative tests to my name, I cannot help but feel sick and anxious that the virus could be anywhere."
>
> "The future has never felt so unclear to me."

There are many themes, commonalities that emerge from the words of these students: loss, uncertainty, fear. There are also insights to be had as well: methods for weathering the storm, for finding the silver lining in difficult times. The fear of "what comes next" with the pandemic is taking up significant emotional and cognitive bandwidth among students, and uncertainty in the classroom is not acceptable for them in the current climate. As teachers, we can provide more detail about classroom schedules and expectations to allay some of this uncertainty. We as faculty sometimes choose to leave expectations vague to push our students to think critically and encourage their creativity, even to help them to become independent lifelong learners, but supports in the form of extensive rubrics and explicit instructions may lead to better outcomes in times of turmoil.

The student experiences during quarantine ranged the full spectrum of human experience, from reconnection and quality time spent with loved ones, to loss of immediate family members. There is no silver bullet to help students in these times—they are all in different places and need different things. I believe our best tool as faculty right now is compassion: assume good intentions from all students when they ask for extensions; be flexible and supportive; hold students accountable and make sure they do their work, but ease up on the strictness of deadlines as there is no way to tell what is going on in their lives. When the rare student inevitably falls behind, show kindness and compassion, direct them to resources that can help them complete their work, and hold space for them if they continue on the path to failure. We cannot prop up a student who isn't doing the work, but we can reserve judgement and be kind to them in their struggles.

The above, like all things, will be refined through practice in the years to come as students come to us with the added complexity of having lived through a pandemic. However, taking a page from Lang's (2016) playbook, what is a small thing we can do in the here and now to impact our students and our teaching? For this, I turn to the sum of what I have learned, through my own story, the trajectory of myself as both student, and teacher.

I believe that all of my students are capable of succeeding, and want to do so, and if they are not it is likely because of external factors that are limiting their ability to do their work. It is these core beliefs that have led me to a protocol. Many students who are struggling will lack either the maturity or the bandwidth to seek help proactively, and we, as faculty should try to keep an eye out for when a student is missing deadlines. When contact is made with a student who is behind on their work, assume they're already aware of the punitive results of their behavior, and rather than reiterating that information, send a message of support identifying the resources they may not currently be utilizing to get them back on track.

I leave you with this final student thought. Instead of condemnation of these efforts, let us see it as benediction, permission to go about this work with data, compassion, logic, heart, and imperfection. There was never going to be a completion. There are many, many things that do not work that way.

> "As the coronavirus took its hold on the world, it forced us to give up the burden of control that we unknowingly placed upon ourselves. Hopefully we'll come to realize that we never really ever were in control and that trying to be is overrated."

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Implementation and Evaluation of Specifications Grading in a Studio Course

This essay describes the implementation of specifications grading (Nilson, 2015) in ARTD 2380: Video Basics. This course engages students in an introductory exploration of the moving image as an art form while learning essential skills and techniques for creating video in various genres. Specifications grading is a method that empowers students and better situates them to manage their learning process by shifting the emphasis from subjective assessment to the achievement of learning outcomes. I compare student end-of-semester reflections from the Fall 2019 and Fall 2020 classes to evaluate the effectiveness of specifications grading from the students' perspective.

Grading students, evaluating teachers, and assessing program outcomes has become synonymous with contemporary higher education. Students receive letter grades for practically every class they take while earning a college degree. However, the accuracy and consistency of grades as a measure of achieving learning outcomes have increasingly been called into question (Davidson, 2017). As a result, some educators are examining new approaches to evaluate student achievement in the classroom (Schinske & Tanner, 2014) to reflect individual strengths, abilities, and learning that are difficult to quantify in a single grade (Blum, 2017).

In light of these trends and the wide-ranging discussions among faculty and administrators across higher education during the spring semester of 2020 in response to the maelstrom of emergency remote teaching, I asked a question: Might this offer an opportunity to investigate, implement, and reflect on grading in my classroom? The upheaval of the pandemic and the urgent need to provide students with increased flexibility while maintaining rigor provided the catalyst I needed to re-center my grading practices around learning outcomes and empower my students to achieve those outcomes. To implement specifications grading and establish better alignment between assessing student work and achievement of the learning outcomes would require that I flatten the assignment and project rubrics to a single dimension. Students either demonstrate mastery of the material, or the work is considered incomplete. By offering the students a mechanism to rework their projects, they can revise their work that does not meet

the specifications of complete work. I hypothesized this would motivate students to master the fundamentals and better achieve the course learning outcomes. I made four changes to the course following best practices described in Nilson (2015) and Schinske and Tanner (2014): (1) create assignments and projects and evaluate them on a complete/incomplete basis; (2) provide clear criteria for achievement of learning outcomes (a.k.a. one-dimensional rubrics); (3) establish a mechanism for managing extension requests and resubmission of work that is not complete; and (4) scaffold projects with low-stakes, structured homework assignments with a reflection component to provide students with the scaffolding needed to complete their production projects. Hands-on workshops with well-defined deliverables, a core component of the course, remained intact.

While it was straightforward to implement specifications grading, I was unsure how to evaluate the effectiveness of this approach, particularly with regards to the student experience. I am sometimes puzzled by the difference between my perspective of teaching effectiveness and what students report in their end-of-semester course evaluations (TRACE). Stephen Brookfield (2017) reminded me that "[o]ne of the hardest lessons to learn as a teacher is that the sincerity of your action has little or no correlation with students' perception of your effectiveness… you can never be sure of the effect you're having on students" (p. 2). This difference hit home. Significant differences between student and faculty expectations for a course are unavoidable (Dangel & Lindsay, 2014), but this no less alters the importance (and impact) of creating a learner-centered experience for our students. Brookfield's notion of being a critically reflective teacher helped me connect my teaching and the reflective practice that is an integral part of my creative work as a documentary maker, so why not leverage the critically reflective approach to analyze the shift to specifications grading? As John Loughran (2002) points out, critical reflection "offers a window into the practice setting whereby the contradictory nature of the two views (students' and teacher's) creates a diversity of ways of seeing actions" (p. 40).

Because TRACE evaluations do not allow respondents to elaborate or provide a rich account of their experiences in the course, they do not afford the detailed descriptions needed to gain meaningful insights into the student experience. I imagined that it might be productive to take on an anthropologist's stance in the classroom. What I needed was something akin to thick descriptions (Geertz, 1973) used in anthropology and qualitative research; however, it is time-consuming and challenging to achieve in the context of a single course. Is there a middle ground? Is there such a thing as "chunky data" that lies between the thick description

of ethnographic practice and the data provided by TRACE? I turned to ethnographic reconnaissance to supply the insights I was seeking. Wolcott (2008) describes ethnographic reconnaissance as a lightweight version of the traditional ethnographic investigation; the reflexive methodology anthropologists use to express a subjective reality from the group's point of view under study, derived from the ethnographer's active participation in the group's culture. The term reconnaissance implies a brief qualitative examination or survey over a short period with limited data, making "spot observations" instead of the more time-consuming participant observation practiced by ethnographers.

To establish a baseline of students' perspectives, I began by reading the Fall 2019 and Spring 2020 final reflections along with the TRACE evaluations. One thing that stood out was that many students disliked doing the homework and vociferously complained that the assignments were not relevant to making videos. If I were going to implement specifications grading and require higher work standards to earn a pass on projects, I needed to provide the students with more scaffolding, and homework assignments had to be part of this. Still, given how much students dislike doing it, I realized I had to start from scratch during the summer and rework this class component before implementing specifications grading.

As a result of embracing a more critically reflective approach to my teaching, I was able to look at the homework, especially the readings, from my student's perspective. I came to understand that I needed to provide a more structured path with immediate benefits. I accomplished this by tightly integrating the homework with the specific skills and knowledge students needed to make videos and discuss their work and their peers' work in the context of critique sessions. I challenged my practitioner's assumptions and blind spots and unpacked the process into a series of steps. My students were novices. There was only so much I could expect them to do with each project. I limited the viewing, readings, writing, and practice scope to the essential skills and knowledge required each week. Each of the new homework assignments starts with viewing assigned videos, then reading one or two chapters from the textbook (along with an occasional article). Students then reflect on the videos using terms and concepts from the readings, followed by producing two short video segments to reinforce their learning.

To help students manage their lives' vicissitudes without a grade penalty, I implemented a coupon system. The system helped to emphasize learning outcomes while offering flexibility within limits (critical during the

pandemic). Students were given three coupons that they could cash in for (1) transforming an unexcused absence to an excused absence; (2) obtaining a one-week extension on a project deadline as long as it was requested before the deadline; and (3) petitioning for the opportunity to rework a project that did not achieve complete status after it was handed in and critiqued in class. I believe this gives students the opportunity to make a choice for themselves between excellence and average performance.

How I've implemented specifications grading may seem rigid on the surface. However, it is quite flexible. While all projects and assignments are mandatory, students can be strategic and choose not to complete particular assignments. While this, in many circumstances, eliminates the possibility of an A as the final grade, it also places control in the student's hands. The coupon system empowers students to take risks, and if those risks don't pan out, they can rework the project. Looking over the work students completed and the self-assessment students shared in their final reflections, I'm convinced that the changes I implemented improved the student experience while creating better alignment between class activities and learning outcomes.

To compare the students' perspectives before and after the course revision, I used thematic analysis (Braun & Clarke, 2006) to code and interpret the Fall 2019 and Fall 2020 final reflections. This approach provided a more thorough understanding of the reflections than merely reading through them. I chose this method because it is not constrained by the limitations inherent in participant responses, making it ideal for examining open-ended data like final reflections. This enabled me to identify patterns from the participants' perspective. I coded 170 phrases from Fall 2019 reflections and 190 phrases from Fall 2020 reflections. I then grouped them into clusters, and from these, I created the themes. Figure 1 shows the themes from six of the twelve questions I asked in the reflection prompt.

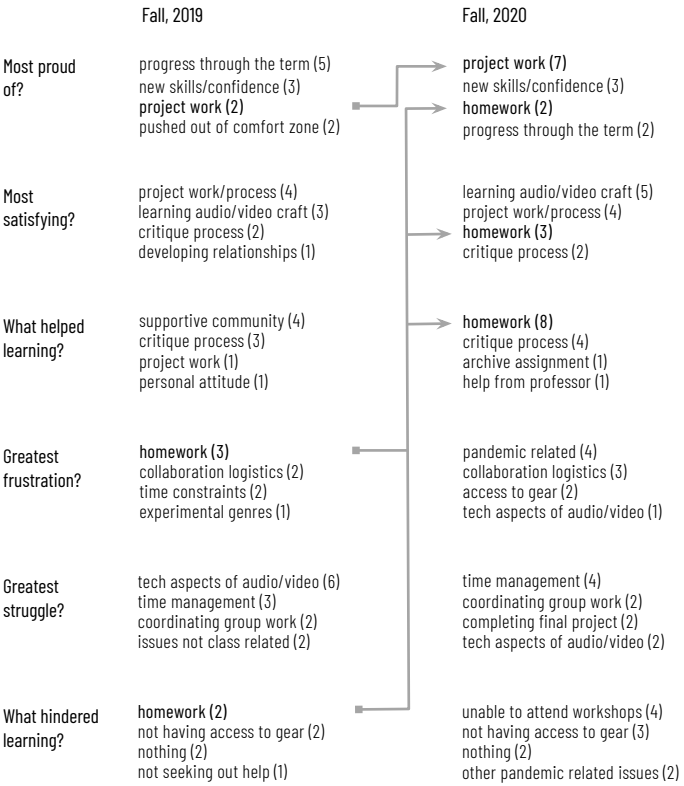

Figure 1. Comparison of dominant themes in end-of-semester reflections in ARTD 2380: Video Basics, Fall 2019 and Fall 2020.

While my study focused on the effectiveness of specifications grading in motivating students to learn more and produce better work, students had little to say about it directly. Still, they had a lot to say about the homework—an indirect implication of specifications grading. First, homework no longer appeared as a source of frustration or a hindrance to learning, and that was my goal. But I was surprised to see that some students included the homework among their proudest accomplishments. In retrospect, I attribute this to making the changes to the homework from a more student-centered stance. I also observed that students took significantly more pride in completing their project work. While it's challenging to determine cause and effect relationships with thematic analysis, it does support a story consistent with shifting the focus to learning and achievement of learning outcomes. It is through the process of reworking a project that students learn how to produce better videos.

In this class of fourteen students, four students did not meet the specifications for a pass on their Final Project. One of these students chose not to rework the project, happy to pass the course but not concerned about earning an A. The other three students used their coupons for the opportunity to revise the final project. I held a learning conference via Zoom with two of them and exchanged emails with the third. I discussed the work's strengths and weaknesses and the revisions required to meet the specifications with all three. All three made the revisions needed to earn a passing grade. I enjoyed how the dialogue was focused on completing the work and not engaging in a grade dispute. I believe this allows students to make a choice for themselves between excellence and average performance. It is through the process of reworking a project that students learn how to produce better videos.

My interpretation is that implementing specifications grading teaches students how to achieve a measurable goal. With specifications grading, students are incented to evaluate the critique they receive from both their instructor and their peers and use that feedback to rework the project to meet the specifications. During prior semesters, I have observed that many students don't read the detailed feedback I provide them once the work is complete. With specifications grading, if the student does not earn a complete grade, they must evaluate the critique from both their instructor and their peers and use that feedback to rework the project for it to meet the specifications. I believe this better aligns the work students do with the course's learning objectives and reflects a more authentic evaluation of their work.

I wrote the specifications for each assignment and project in a relatively straightforward manner, and the critique from peers usually mirrored my critique. I entered into a dispute with only one student; however, the stakes were about iterating the work, not the final grade for the semester. This approach shifts the conversation to the quality of the work and learning outcomes, rather than arguing over subjective gradations between a B and an A. Ultimately, I see my role as a mentor helping students develop their video production skills, analytical abilities, and aesthetic sensibilities. When a project meets the specifications, I can focus my critique on what's particularly compelling about the work.

A possible downside to the way I implemented specifications grading is increasing instructor workload. For every project that does not meet the specifications and a rework is requested and submitted, there will be additional time required to evaluate the revisions. What has helped in this

course is that video project critiques are performed with the entire class, and therefore students are receiving feedback from their peers and myself. However, the time commitment to evaluating reworks is still an issue. In a course implementing specifications grading, incomplete/complete becomes the grading dimension for assignments. Students learn that mediocre work represents unfinished work, and iteration is often required to achieve learning objectives fully. I discovered that specifications grading offers a viable alternative to traditional pedagogy and provides a framework for creating better alignment between coursework, assessment, and learning outcomes. A collateral benefit is that if students are completing courses, they are automatically meeting the course's learning objectives, which, in turn, meets program objectives, vastly simplifying the process of program assessment.

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Online Laboratory Courses: Can We Do It? Yes, We Can!

Three years ago, I set out to create a laboratory course for graduate students interested in interdisciplinary research techniques. Having spent many years mentoring graduates and undergraduates in the lab, I had frequently observed researchers trained within the boundaries of traditional STEM disciplines struggle with identifying and mastering new tools and techniques outside of their discipline. I wanted to create a course that would lower barriers to trying new interdisciplinary research techniques.

At the time, I was teaching students from 18 different STEM disciplines across 5 institutions in a shared NUflex-like hybrid classroom setting. My students would watch weekly interactive multimedia lectures online and then attend NU-led case studies and discussions synchronously from a classroom at their home institution. Students collaborated across institutions to complete assignments and team projects using a shared learning management system. This one-of-a-kind learning environment posed a very unique challenge that has now become commonplace since the COVID-19 pandemic: How can an instructor provide both on-ground and remote students with a meaningful and equivalent laboratory learning experience?

As I set out to design the first iteration of my course, I was very surprised by what my literature search revealed. There was a strong bias against online laboratory courses, which most papers dubbed as "non-traditional labs," due to the lack of hands-on learning experiences. The pedagogical value of in-person lab practicums was well-established (Singer et al., 2006; Wankat & Oreovicz, 1993), but that of online laboratories was contested. The STEM literature revealed a tremendous variety of online laboratory formats, ranging from virtual simulations to remote instrument operation, with very little comparison between them. In fact, several papers demonstrated in well-controlled trials that online labs could not replace in-person labs! The authors of these studies suggested that online science and engineering labs were better suited to reinforcing conceptual understanding and inquiry skills after students had already gained their hands-on skills. Other studies reported no significant differences in the acquisition of conceptual knowledge (Mosterman et al., 1994; Wiesner & Lan, 2004), leading to the permanent integration of online labs into undergraduate STEM programs at several prominent universities.

To make sense of this contradictory literature, I found it useful to frame the problem in terms of learning outcomes. Physical experiments focus students on operating equipment properly and obtaining meaningful data (Koretsky et al., 2008). Students acquire hands-on skills in data collection, troubleshooting, and data reporting, but knowledge construction can fall short due to the limited time for iteration and reflection (Gunstone, 1990). Remote instrument operation broadens opportunities for distance learning, but often suffers from the same shortfalls as physical labs, with resource and time constraints leading students to follow a linear experimental approach rather than an iterative approach (Koretsky et al., 2008). In contrast, virtual simulations enable students to use more complex inquiry practices to separate variables (Klahr et al., 2007; McElhaney & Linn, 2011) and better understand the consequences of changing variables (Lindsay & Good, 2005), even when provided less guidance than in a physical laboratory (Renken & Nunez, 2013). This is likely due to fact that well-designed virtual simulations can provide instantaneous results, clean data, and opportunities for multiple iterations. Taken together, these studies suggest that different modes of laboratory delivery can lead to different learning outcomes. If true, this would mean that if we pair the right mode of delivery with the right combination of learning outcomes, we can maximize learning, even in an online setting.

I became particularly excited at the idea of building an experiential learning laboratory framework that would allow students across a range of disciplines to participate in either a hybrid or online format. I started with Dimitrov and Haque's (2016) model for multi-disciplinary intercultural teaching to identify a set of intentional facilitation and curriculum design elements that could I build into my course to promote learning within a diverse community. I then sought to create a combination of lectures, laboratory demonstrations, protocols, and activities that would deepen content knowledge, link theory to real-world applications, and improve complex problem-solving skills. I selected these learning outcomes based on literature which suggested these outcomes to be ideal for online laboratories. But before offering the course fully online, I decided to do a staged course build-out. In Years 1 and 2, I provided students with fully narrated online lectures, weekly in-person laboratory demonstrations/activities, and weekly data analysis assignments. After the second iteration of the course, I built an interactive Articulate Rise 360 website embedded with fully interactive multimedia, including narrated Storyline lectures, detailed laboratory protocols, and video demonstrations. In Year 3, I piloted the course in 2 parallel sections, one hybrid and one fully online.

The Current Study

For my Scholars project, I decided to embark on a retrospective study of my course data. Having previously looked at student outputs, which showed strong evidence of fulfilling course outcomes, I now wanted to focus on student perceptions of learning. I was curious which course activities were most valued by students, and whether this could provide any information on best practices for designing and teaching laboratories online. My data set included 3 years of anonymous course surveys (29 hybrid students + 19 online students) and 3 years of end-of-semester TRACE course evaluation data (38 hybrid students + 7 online students). The course surveys included remote students from other institutions, whereas the TRACE data collection was limited to NU students only. All 3 years of the course were taught by me alone, with a mean TRACE instructor effectiveness score of 4.7 ± 0.1 across all sections, which allowed me to feel comfortable comparing data across years.

I found it very interesting to look at how the TRACE scores changed with time (Figure 1). For NU students in hybrid sections, the importance of online materials for learning (Q3) and digital materials for course success (Q351) increased each year as I provided more materials online, with the average TRACE score rising from for 4.3 to 4.8 for both survey questions. Student perceptions of learning from out-of-class assignments (Q4) rose progressively from 4.3 to 4.6 while the recommendation that the instructor continue requiring digital materials (Q352) rose from 4.5 to 4.8. Interestingly, NU students in the online section placed a higher priority on online materials (Q3, 4.9 vs. 4.8), out-of-class assignments (Q4, 5.0 vs. 4.6), and required digital materials (Q352, 5.0 vs 4.8). I believe the difference between these two student populations may reflect differences in student expectations, with hybrid students expecting to learn both in-person and online, whereas the online-only students were fully reliant on the online materials and thus were likely to value online materials more highly.

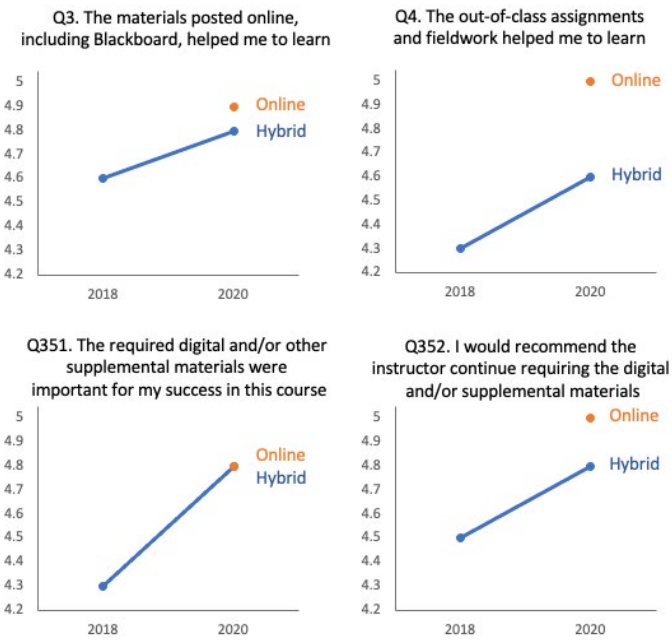

Figure 1. Student responses to end-of-semester TRACE course evaluation questions, plotted as a mean split by hybrid and online section with questions numbered according to the TRACE Question ID (Q#).

My observations were further substantiated by qualitative comments found in my open-ended anonymous course surveys. When I asked students about what course materials or activities helped them learn the most, every single student described one or more online materials, including the online lectures, protocols, supplementary multimedia, simulations, and/or interactive knowledge checks. Only 14% of students mentioned the in-class (live or recorded) demonstrations, but when they did, it was always within the context of being able to learn after becoming prepared by the online materials. For this small group of students, typical comments consisted of: "The live experiments and online modules helped the most for me. This is because the pre-demonstration modules were always sufficient to give us all the necessary information we needed before the demonstrations took place. This always made me feel very comfortable with the new information I was taking in and helped greatly with assignments." When the COVID-19 pandemic necessitated a full move to online, both hybrid and online students expressed appreciation for the online course activities, with comments like: "I loved that so much material was online and easy to find. In a time of so much turmoil, I was excited to have one course that did not need to change."

Based on student feedback, course elements that were most valued by students included:

- Course materials presented in a repeating weekly module structure for ease of access;
- Online materials written from a second-person perspective to personalize the learning experience;
- Curation of multimedia in a self-contained website to maximize engagement while maintaining focus on key content;
- Activities involving self-guided inquiry to provide students ownership over their learning; and
- Use of branched interactive scenarios at the end of each learning module to check student knowledge and reinforce key concepts.

This project has reinforced for me the importance of not only collecting data about my courses but looking at (and acting upon) what I learn from the student feedback. While I have always viewed teaching as an iterative project, with room to improve year upon year, the activity of comparing data across multiple years has showed me that it is possible to continue discovering new information from feedback I had already looked at. I learned that it is worth spending time to build out quality online materials, since these materials not only impact student learning, but how they value what they are learning. Students do want live interactions with their instructors, but with careful scaffolding, it looks like much (if not all) the learning can come from interactions in the online space. Developing my course as a staged roll-out, driven by both evidence from literature and student feedback on learning, is what has allowed me to innovate new ideas with a high likelihood of success and ensure that the students learned what I expected from the online course materials. And most excitingly for me, I have a growing list of new ideas to integrate into my upcoming spring course.

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