

# Transcript for Teaching Talk #5: Assessments, Student Collaboration, and Integrity

**Dale Lackeyram:** Good afternoon everyone, my name is Dale Lackeyram from the Office of Teaching and Learning and welcome to another one of our Teaching and Learning talks.

I'm going to start off by acknowledging our spaces and the fact that we're in different spaces and places that are governed by many different treaties and relationships to the land. In particular now and with the current social issues that we are experiencing the Dish With One Spoon covenant and our collective responsibilities to each other asks us to consider how we enact peace, friendship and respect in our daily lives and actions.

We have a little bit of housekeeping for today's session. For those of you joining us for the first time, you would know that the session is being recorded and a copy of the presentation will be made available via email that you will receive after the webinar and our website as well. Our panelists will be speaking for about 20 minutes or so and then we'll move into a question and answer segment. Lastly you will notice at the bottom of your screen that the question and answer window is available for you to post questions to our panelists. Feel free to utilize that throughout the entire presentation and we'll try to get to as many of those questions as possible as the webinar proceeds.

Today I have the pleasure of introducing Dr. Matt Demers from the department of math and stats and Dr. Julie Vale from the School of Engineering as they discuss student collaboration and integrity of assessments in a remote teaching context. With that, I'm going to pass it over to Matt I believe who is kicking us off to get things going. Take it away Matt.

**Dr. Matt Demers:** Hi everybody and thank you Dale, my name is Matt Demers and yes I am a teaching-focused faculty member in the department of math and statistics and Julie would you want to introduce yourself right now?

**Dr. Julie Vale:** Sure I'll come back in real quick to introduce myself I'm Dr. Julie Vale I'm also teaching focus I'm faculty in the School of Engineering and I'm also the area head for engineering systems in Computing and Computer Engineering.



**Dr. Matt Demers:** Great, so we're going to talk to you today. I want to kind of preface that first of all, this is a fantastic opportunity and is a realization of my lifelong dream to have the chance to do a presentation with maybe not having proper pants on. You know, I'll leave it to your imagination whether they exist or not but this is this is how it's going to be. In all honesty though, I don't think that we're here to impart anything particularly groundbreaking. I don't want to give the impression that we're here to tell people: "this is what you should do or this is the best thing to do", I think that our main aim here is simply to share some experiences and to share some ideas. I really think that one of our greatest resources in SEPs and actually the university as a whole of course -- one of the greatest resources is each other and sharing those experiences. I don't think that we talk to each other enough when it comes to some of our teaching practices and some of the ideas that we do have and this seems as good of a time as any to do just that.

So, we're going to be talking a little bit about a couple of the ideas that we had with our courses and respond to some of what I want to say are preconceptions. You know, there are a lot of things that in conversations with other faculty members - ideas of what could and could not be practically done or different limitations and restrictions and so on, brought about by the situation due to the pandemic. And that maybe it just takes a little bit of a perspective shift or some creativity to see that you do have other options and we're just here to share a couple of them.

So just for context, the courses that we're dealing with here are a second-year course and a first-year course and both of them are what I would say are very large courses. My own was a second-year math course numerical methods, it's a course that basically focuses in on algorithms and how to do math and practice using computers and so on. There are 600 students in this course, primarily students in the College of Engineering and Physical Sciences and Julie's course was engineering 1500 which is engineering analysis, which is a course that focuses on linear algebra in the context of engineering applications. 250 students and all of those are engineering students. Our courses in our conversations we realized that they're really similar in our planned structures, we both had two midterms, we both had a final exam planned and we had labs that involved coding assignments and I believe both of them were actually in MATLAB so there are many parallels between the two courses and it's really interesting that we both responded in a similar way to some of the evolving situation in March and April.

The two things you'll notice that in the different coloration at the bottom there are some of the things that had to be adapted in that situation in that both of us had a final exam that had to be shifted and both of us had to figure out what we wanted to do with those coding assignments which relied on lab space on campus that was very suddenly not accessible anymore and finding a suitable replacement for that was important. So, some of the considerations here were obvious because we're all in this we all had to make decisions and in a limited timeframe right? We you know, had only so much opportunity when it came to figuring out what we could do. Many of us have engaged in course development or redesign in the past but none of us have had to do it within a week and that was very challenging.



**Dr. Matt Demers:** We also had some other things right I spoke to a few faculty members that were worried about performing a redesign that might require additional resources in terms of TAs and found this to be a limitation. Many people I spoke to, and this is an ongoing point of conversation and will be into the fall, is preserving academic integrity which has a whole number of challenges and of course there are lots of concerns regarding accessibility webcams, internet quality, Respondus and other kinds of things. As we know, there's a bit of a debate about that sort of browser lockdown and Respondus and some faculty about concerns some schools have you know disallowed its use based on those concerns and so those were obviously in play.

The way that we had that week in late March where we were given a bit a bit of a pause to try and figure out what the heck we wanted to do and the way that I eventually, personally kind of felt about the situation is that maybe there are a number of different kinds of potential redesign aspects or things like I felt like folding into my course. The courses in the past, where due to time or due to whatever else or maybe due to comforts and habit we have an adopted frame. Some of these things involve collaborative assignments or open book tests and all of this kind of stuff and so I kind of realized in the short time that maybe this was exactly the right time with a sudden ability and approval to be very flexible from the administration and with few weeks to get things down and make make those changes and so on, i thought that maybe this was a very good opportunity to do a little bit of experimentation with different course design aspects, which would be different creative methods for teaching learning and assessment. I want to talk about my own experience and then Julie will talk about hers.

In numerical methods we had three labs at the end of the course that were planned these are labs where typically we would focus on a method from the week before or algorithm or one of the topics from lectures and students would in the next week have to code a small, low-stakes assignment about 1.25% a piece. So these three labs together where were 3.75% of their final grade so we're talking low-stakes right now and this was something that I decided after a little bit of a thought and reflection to replace with a single actual project - a written project in the form of a research report. What essentially they had to do was to research some sort of numerical method that we had not covered in lecture. This was different from anything I had planned from their actual labs and instead of the typical lab times where they would do those coding assignments, I encouraged the TAs to be available for consultation in case they had any questions. I wanted to leave it very broad, I wanted it to be open-ended, I wanted students to be able to demonstrate that they had the capacity to do a little bit of independent research and then report on what they did and they could do so in all sorts of methods.

**Dr. Matt Demers:** I will show off a few of the pictures and so on that I had submissions of in a couple of minutes. It was optional and that just reflects the evolving nature of the end of the course. And I want to say as well that I opened up my office hours virtually to be able to talk with students about their ideas to coach them to say whether an idea was suitable or not and provide a little bit of preliminary feedback before they would submit a final project and these were typically no longer than five pages. So as I said low stakes, low stress I honestly think but really encouraging for students to find and learn something new. So the buy-in was optional and we had 601 (six-hundred and one) at the end of the course and 210 (two-hundred and ten) of the students ended up submitting which was really cool, I think that I had about 100 (one-hundred) or 120 (one-hundred and twenty) projects. I don't have that number exactly and I forgot to mention before that it was collaborative so students had the option of working with groups if they wanted to and so that was an important aspect here and I wanted to encourage that. I want to say that after those projects were submitted I got feedback from numerous TAs that they were very impressed with some of the things they found in those student projects. In some of the conversations that I had the students during those office hours it was the case where a couple of students had some very cool things to say - they were actually excited by what they were doing and what they were learning and that they were surprised that they had been able to really learn something when a lot of them went into these last three weeks not expecting to do anything. I think that a lot of students were also feeling that pinch of... I don't want to say feeling the pinch but because of the wide variety of things that they experienced in other courses they weren't sure about expectation levels for any particular course and so I think many of them felt like they got more out of this than they expected. The grades were high and that's to me not super concerning because most of the coding assignments were similar in terms of those grades. I was more concerned with seeing that variety of ideas and and creativity and students did put forward some remarkably creative ideas. We had people that put forward code, we had people that put together pseudocode, we had people doing flow diagrams hand-drawn pictures examples.

One of the things that kind of have defined my first and second year courses lately is having these fill-in-the-blank manuals that are written in a friendly way that have examples embedded and so on. I had one group that wrote their own chapter in their own voice with fill-in-the-blanks and examples and even their own "for you to try" section, which is echoing the sort of "for you to try" example sections that I include my course manual which I thought was frankly adorable but there was a lot of really neat things that some students threw themselves at some pretty challenging topics and while they weren't always successful, it was really neat to see.

To address a couple of big concerns I want to say that some faculty that I spoke with had concerns about you know a lot of these redesign ideas being too much work or a lot of efforts within a short amount of time but I want to say it was no harder than anything I would have designed otherwise on my ends in terms of workload.

**Dr. Matt Demers:** With regards to concerns about TAs and resources, I would say that this isn't about requiring additional TA resources, it was more about a reallocation of TA resources from one thing to another and the net effect of that was that I don't know that I required any additional TA time that I would have normally or even less perhaps. I was really impressed with how this turned out and to my surprise that lemonade that I made it for the lemons and so on this is something that I I kind of want to do going forward even after we're done learning in an alternative assessment file. I think this is an actually valuable idea and I want to include it in future offerings of the course and I would not have known that if it wasn't for the situation at hand.

Anyway I go on for a little while here I also did some work with allowing for a collaborative final exam and one of the reasons that we were put together, myself and Julie is because we had similar ideas on that front so I'm going to let her speak about what she did for that and so Julie if you want to take the floor I'd be happy to give you the stage.

**Dr. Julie Vale:** Hey thank you very much. So Matt's going to continue to drive for me so a little bit of context: ENGG\*1500 is a linear algebra course as Matt said that focuses on the applications of linear algebra to engineering but at its core it is a fundamentals math course in a lot of ways. So, the traditional assessments would have been closed book with no calculators to try to help students develop their mental math skills and it would have been a large exam in a big Rozanski classroom, invigilated, individual exam due to the COVID situation, that was no longer an option and so I had to think about how I was going to deliver an exam to 250 (two-hundred and fifty) students in this situation.

I was deeply concerned about accessibility issues, so I asked my students through an informal survey what kind of access they had to internet and webcams and other devices like that. I asked them about their comfort with Respondus and the overwhelming reply was that there were people who had serious issues with connectivity or access something like 30% of my students reported that they did not have a webcam which would have meant they would have to go and buy something in a time when as far as I know, they may or may not have their parents themselves may or may not have jobs in order to be able to afford these things so these equity issues were front-of-mind for me when I was trying to make my decision about how to adjust my exam.

Also I've always had the belief when it comes to academic integrity that if we focus on trying to design our assessments or assessment situations to make it easier to catch people who cheat, then it becomes an arm race because they just get better at figuring out ways to cheat so my preference always has been to try to design my assessments in such a way that either cheating won't help them or the cheating isn't really possible and so I took that philosophy and applied it to the exam in ENGG\*1500 and so I said to myself well if they're all at home and I can't have a direct invigilation over them and if I'm not a fan of Respondus for various reasons then my only real option is to go open book because they're going to go open book anyway, whether I tell them to or not.

**Dr. Julie Vale:** Same goes for calculators, and are they going to collaborate? Well of course they're going to collaborate. Now I want to point out here that there's going to be a percentage of your class that when you tell them the rules they will follow the rules there's going to be a percentage of the class that's going to cheat no matter what and then there's going to be that messy middle and the messy middle is the group of students where circumstances are primarily going to be the things that dictate whether or not they choose to cheat. So, my idea was that by going open book and allowing calculators, I would at least put everybody on the same playing field so that those people who will follow the rules are going to have an equal opportunity if you want to put it that way to do as well as everyone else or have access to the same materials as everyone else. But that still leaves the question of the collaboration because there's a real situation that happens where people will post the questions to sites like Chegg or other places like that or to large Facebook groups where the majority of the class is on the Facebook group and then they they work collaboratively to come to an answer and then everyone puts the same answer on their exam and so I thought to myself if there's going to be a number of students who are going to collaborate anyway I'm going to let them collaborate and I'm going to try to control that collaboration.

Now for the record I want to say that this idea did not come from myself. Way back when I was in undergraduate engineering, one of my second year engineering courses in programming said: "okay, I don't care who you work with you just have to write the names of the people that helped you on your assignment" so I thought can I take that on apply it to this exam sure why not. So I said to the students you are welcome to collaborate in small groups of three to four and you are required to indicate who you collaborated with, so Matt can you go to the next slide please?

Alright, so how do we make sure that that collaboration is done in an equitable and ethical way? Well as I already said, I told them: "okay go ahead collaborate in small groups" and I explicitly asked who they collaborated with.

So on the screen you can see an example: I put this table with each question on the exam and I said tell me who you collaborated with and what the nature of that collaboration was and some students contacted me and said: "well, I don't really have very many friends in the class, how am I going to find people to collaborate with" and I thought oh that was something I didn't think about so I created a discussion forum explicitly designed to help students connect with other students to ensure that everyone had an equal opportunity to build a collaborative group and as far as I know the majority of students took advantage of that.

So the next question is what about this open book piece, I mean we're talking about a first-year class that is supposed to be focused on math and it seems kind of counterintuitive to go open book but it's not that crazy to do it. One key way is instead of just asking the students to calculate something, ask them to reflect on the implications of that calculation, so instead of just saying: "you know what's the square root of five?" you can create like a problem where they have to calculate the square root of five and then when they find the answer you can say: "okay well what does that mean to you in the context of this problem?" and it might seem like that's a lot to ask of a first-year student but it's not.

**Dr. Julie Vale:** They did quite well on this and similarly you can ask them more open-ended questions, you know "is it possible to do this, why or why not and explain".

The other piece that I made sure to include that's not explicitly listed here is that I did have calculation questions and I said: "you have to show your work in order to get full grades", because if you're part of the course that involves calculation of complex numbers, then that's easy to do in the calculator and you could just write down the answer and I said: "no, if that's all you do then you get zero - you have to show me the thought and the work".

Okay, so the other thing is this idea of open-ended analysis with many correct approaches and so one way that I did this was instead of having them do the calculations themselves, I provided them the results of the calculations, I gave them the data, I gave them the graphs and I asked them to interpret those things or I asked them how could they have generated those things and one of the other things that I like to do whether an exam is open book or not is to provide something that's been done wrong and to ask students to find the error and explain the misconception. So part of the philosophy behind all of this is I'm trying to increase the metacognitive skills of the students and I'm trying to get at the piece of analysis and the piece of thinking that we often miss which is thinking about your answer checking your answer recognizing whether or not your answer is right or wrong and why.

So here are some examples of things from this year's ENGG\*1500 exam that I just want to highlight how I implemented this. So we've got some boxes around things, I know it's a bit small for some of you maybe but you can see on the top left I've provided a plot and I said: "based on the plot can you classify the mystery patient" and I've also said: "Mr. x (who's a character that I use) has made a mistake. What is it?" and there's a lot more context in these questions so it's hard to see or visualize this maybe directly just from these examples but you can see on the top right showing and giving an answer without showing relevant steps will yield a grade of zero.

I have a question that says: "hey, here's the data what do you do with this data? What vaccines should she select? Discuss the implications of your answer." and these are the kinds of things that I did. It seems like this would be a heck of a lot of work and you would need to do this every single time you created a new exam and you can never reuse any of your questions and I just want to address that really fast too because I had a deferred exam and the student who wrote the deferred exam had seen the original exam and there's good reasons for what happened. So I had to ask myself: "well how am I going to give a fair deferred exam which isn't the exact same when he's already seen?" and it occurred to me that I didn't have to recreate all of this underlying data, it was as easy as changing the "what about?" or "what if?" or the "how did?" questions that were associated with each one of these, so for example we had that plot in the middle where in the original exam I said discuss the implications of this, that or the other thing and in the new version of the exam I said: "here's the plot that was created, how would you check the results at year one and a year ten?".

**Dr. Julie Vale:** So you can use the same underlying problem and ask a slightly different open-ended analysis type question that will allow you to get at these things.

So the big question is did it work right? I allowed collaboration all of these other sorts of things. I think so, but it's hard to know for sure. I can tell you that grades were similar to previous offerings, I can tell you that students still failed the exam and you didn't still aced the exam and I can tell you that there was no evidence of huge group collaboration so there was no uniformity of answers in any of the questions that I asked. There were definitely many different approaches to answering each of the questions and I can say that I had a unusually low number of students who did not write the exam I only had four who chose not to write and self-reported from the students was that they felt that this was this approach significantly reduced the stress that they were under, specifically because a lot of students were getting very concerned about Respondus.

So I'm going to take a quick opportunity, I see a couple of questions so I'm just going to take a moment to answer those questions if that's all right with Dale & Co.

So, there's a question about what kind of information was I looking for when I asked students about the nature of collaboration with others. So that's one thing I would actually make a small change to because I don't think the students understood what I was getting at with that so I got some really interesting answers. I got people who said they were a friend. What I meant was I wanted to know whether or not they looked at the question and discussed the question and then went off and did their own answers or whether they did it on their own first and then checked their final answer with their friend and I did get some people who reported that kind of information back to me. I did actually take all of that collaboration information and collect it up into a single Excel spreadsheet trying to decide whether or not I was going to use it to do any kind of analytics. I had no intention of using that analytics for the grades and I did tell the students that ahead of time that I would not use that information in any way shape or form to affect their grades. I have not sat down and done any analysis on it yet and to be honest I don't know if I will but I do have it all collected up into a nice spreadsheet the other thing I want to very quickly mention before I hand it off to Dale to moderate is that I used Crowdmark for this course and that was crucial to making it work effectively. I had already used Crowdmark for the first two midterms and so using Crowdmark to administer a remote exam for the final exam was very easy to switch over and do that.