Brenna Clarke Gray:

Hello, and welcome to You Got This!, a podcast about teaching, and learning, and sustaining community for everyone at Thompson Rivers University. I'm your host, Brenna Clarke Gray, Coordinator of Educational Technologies, and this podcast is a project of your friends over at Learning Technology & Innovation. We're housed within open learning, but we support the whole campus community. I record this podcast in Tk'emlups te Secwepemc within the unceded traditional land of Secwepemcú'ecw, where I hope to learn, and grow, in community, with all of you. Today's episode is about technical difficulties. It wasn't about technical difficulties, until I had to rerecord the episode. Let's get into it.

Brenna Clarke Gray:

It's Friday morning. It's Good Friday, in fact, because Lord knows, I'm never ahead of schedule with the podcast. And this episode should come out this weekend. And it will, because everything always happens eventually. But, my husband doesn't have Good Friday off, so he's working. The Groot is happily watching his cartoons in the other room. And I set aside half an hour to record the introductory essay, make sure everything was tidy and then I was going to come back and do the audio editing later.

Brenna Clarke Gray:

I recorded, I exported, I played, and nothing. I figured I screwed something up. Okay. So, I recorded, I exported, I played, and nothing. And sometimes, when you're someone who works with technology all the time, you do tend to get into a head space of just expecting it to work. You stop doing all the little checks and balances that would keep things rolling properly. And I think these experiences are important, not just because they are humbling and humanizing, and we could all use another dose of that once in a while, but more because, as someone who supports users of technology, it's really important that I be reminded of how flipping demoralizing it is when technology doesn't work, and you can't figure out why.

Brenna Clarke Gray:

I've been fricking around with this thing since, oh, I don't know, like 9:30 this morning, and it's 10:30 now. And no, it's not, it's 10:45. And I only just figured out, that the problem was that the mic cable had come unseated. Not completely unseated, because the lights were still on. Everything still looked right. But unseated enough that the audio wasn't being captured properly. I've got all these corrupted transcription files, and I've got all these audio files that won't play. I'm just thinking to myself, "Yeah, this is what happens when you don't double check."

Brenna Clarke Gray:

See, if I was teaching you how to podcast, I would go through the motions of showing you how to check every single time, that everything is plugged in, to do an audio test every time, to not just bluster in to your recording. Do I take my own advice? Do I heck as like. It's a good reminder, that the way we feel when technology fails on us, particularly when we are time pressured, which who amongst us isn't? It's, I don't know, the only word for it is demoralizing. I was like, "Well, I guess there's no podcast this week. I can't be doing with this frustration. No podcast this week." Obviously, I have played through the pain, and the intro essay was, eh, there was nothing write home about anyway. It's better, I think, to spend this humanizing moment, reflecting on why we should always go through those introductory check steps every time, no matter what.

Brenna Clarke Gray:

One of these days, something is going to happen smoothly in my world. And when it does, I'm going to do a whole podcast about that. I promise.

Brenna Clarke Gray:

It's probably fitting that I am interviewing Emad Mohammed today, and I am so excited to share our conversation with you. Emad is here to talk about the software engineering program, which is graduating in its first cohort of students this year. And listening to his passion for the subject matter, his excitement for the discipline, and his sense of what this program offers, not just to our students, but to the community as a whole, well, I found the whole conversation really inspiring. Listening back to it before I came back to re-edit this again, was a reminder that I don't actually hate technology. I just hate it when it doesn't work perfectly for me every time. Anyway, I'm going to let Emad take it from here.

Brenna Clarke Gray:

I am here today with Emad Mohammed who is going to talk to us a little bit about the Bachelor of Engineering in Software Engineering, which is a new program here at TRU, but I wanted to start by inviting Emad to introduce himself, and then maybe let us know where people might have seen you around campus, or how long you've been at TRU, that kind of thing.

Emad Mohammed:

Yeah. Hello everyone. This is Emad Mohammed. I am an Assistant Teaching Professor with the Department of Engineering at TRU. The program is software engineering. Also, I'm Adjunct Assistant Professor at the University of Calgary. Here at TRU, we have the software engineering program, started since five years ago, and we have our first graduating student cohort this June. They already secured the job through wonderful intern and co-ops they went through, and I invite everyone to come and talk to us about the software engineering program.

Brenna Clarke Gray:

This is fantastic. So, the first cohort is graduating. That's amazing. How many students came through the program?

Emad Mohammed:

Right now, in the graduating cohort, we have five students, because we start very light, as five years ago. But our current Fall may go up to 35. Seats are being booked very quickly. And I really encourage everyone who's interested in this program, to go ahead and apply.

Brenna Clarke Gray:

Oh, that's fantastic. What was the impetus for developing this software engineering program at TRU?

Emad Mohammed:

Well, we definitely want the engineering society to develop, and we want to engage a student in the technology in general. And one of the hot topic and in high-demand jobs at the moment is software engineering. Software engineer can work everywhere. They can work in startup companies. They can work in established company. We thought at TRU, it might be a very good chance for the economy, for the community, to develop this program, and to provide a wonderful experience to our students, and

equip them with the state of the art tools and techniques, that can help them find their jobs in the software engineering industry. We train them to become a professional problem solvers, in terms of building software and apps, that can be used on a regularly base.

Brenna Clarke Gray:

So, this is our first engineering degree program, right? We have eight students who take engineering courses and transfer, but this is our first homegrown degree program. Is that right?

Emad Mohammed:

Yes. That's correct. We still have the transfer programs, since a while ago, but this is the first time at TRU to have an engineering department, and software engineering programs that train students to become professional problem solver in the software industries. They can become Solution Architect to design the software solution, so they can become Software Quality Assurance, Security Analysts, Artificial Intelligence and Machine Learning Engineers. They can work in every single industry, regardless of the scope of the industry. They're very supportive to the current initiative that Canada adapted to empower engineering in the society, and to become self sustained in the country in the near future.

Brenna Clarke Gray:

And you said, we've got five students graduating, and they're all going into employment positions. Is that right?

Emad Mohammed:

Yeah. Most of them already secure jobs. They already signed contract, and they just cannot wait till the graduation day, so they can get the contract. The other of them still looking, but their future is very bright and they are really good students. And I believe, once they graduate, they'll land their first job within a month of two of doing their search. But definitely, some of them already secure the jobs, and the other waiting for graduation.

Brenna Clarke Gray:

Oh, that's fantastic. And I noticed it's a five-year program, and it sounds like you've really built co-op and internship into the program itself. Is that right?

Emad Mohammed:

Yeah. Actually after the third year, there is a one academic year of mandatory co-op. They need to get engaged with industry outside the university restrictions. You need to get out and work with professional engineers for entire academic year, to learn from them in the industry, and also to gain, as a professional engineer, experience. This will count towards their license, so after three years they can go and write their professional practice exam, so they can get their professional engineering license, and start to be completely independent, and provide service to the public on their own.

Brenna Clarke Gray:

I guess the students who are graduating this year, they must have been trying to do that co-op term during COVID. Is that right? When things were shut down. Did that impact their ability to find co-op employment at all?

Emad Mohammed:

Well, definitely it's a challenging time for everyone, even to find a grocery online during the COVID.

Brenna Clarke Gray:

Yes, that's true.

Emad Mohammed:

But, we have here on campus, we have a co-op office, and co-op officers, to help students match them with their industry. And due to the nature of our professions, that you can design and implement the software remotely, most of our students get some part of their intern through online engagement with industry, and others went through in person.

Emad Mohammed:

But yeah, COVID add some restriction. But we try to ease this restriction by connecting them to industry early as possible in the program. Actually, from the second year, the co-op officers start looking at their CV, start connecting them with industry partners, making sure that the industry partners are professional engineers, so they can acquire the one year of professional engineering experience. But right now, we are going to more in person. We don't have this issue any more, and student actually can find a lot of co-op out there. And our cohort, this is ready for co-op, I believe most of them already land their co-op, and they're just waiting to, they serve the year to complete the exams, and then they will go on their co-op.

Brenna Clarke Gray:

That's fantastic. And I'm guessing, as the program grows, particularly for local industry, it must be great to have so many willing, eager budding Software Engineers in the area, as work really changes. You mentioned AI, and machine learning. These fields, I work in educational technology, so they're certainly not untouched by those concepts. And it seems like a really great boon to the local economy, to have growth in this program too. I would imagine.

Emad Mohammed:

Yes, that's completely true. Actually part of the curriculum is highly aligned with industrial goals and demands. Most of the co-op students, they come back with ideas from industry for their fourth year project. And also they come with a request for a specific skills.

Emad Mohammed:

We comprehend the skills, and these requests, and we reflect back on our curriculum, to prepare them for the industry. And actually, I'm highly engaged with many industrial projects, and many industrial partner. And every now and then, in high frequency, I received job requests. And they ask me if I can find a candidate or two for them. Sometimes they ask for four candidates. But unfortunately, since we have only five students, and the demands are high, and they still on their exam time, we cannot find the right candidate at the moment. That's why we go back to the curriculum, and try to engage students, and motivate students to join us. Hopefully in the next two or three years, we really will have a high volume of graduates that can fulfill the gap.

Brenna Clarke Gray:

What are the requirements for the Bachelor of Engineering program? I noticed it's a selective admission process, I would imagine. Yeah?

Emad Mohammed:

Yeah. Actually the requirement are already posted on our website. There's a requirement for chemistry, and physics, and math, and pre cal class. And those are around 70% or 67%. It's not really much on high demand, because we understand our high school students still to learn a lot of stuff. And we were doing this in the first year.

Emad Mohammed:

In the first year we build on what they have on the high school curriculum. We give them some stuff related to calculus, physics, chemistry, to reinforce the concepts that they already studied. And we increase their level of competency in these courses, and prepare them for the next year. I believe it is within range, and most of the students can achieve that. The only thing that I see, that most people do not know about us, and we reach out for high school many times, and still do not know about us.

Emad Mohammed:

We needed to have a sustainable flow from high school students, into our university. And we teach and educate them about our program, because very interesting program right now. We have people coming to us from Alberta; from Saskatchewan, Regina; from Ontario. A lot of people heard about the program, and they're really willing to come and join us, simply because we are a small cohort. And with a small cohort, we devote all of the resources to the students. We are the faculty member teaching the lectures, and also we're teaching the labs. And we are here in the remaining time to support them in one-on-one fashion. So really, really students like the efforts that we do to increase their competency, to find the job.

Brenna Clarke Gray:

There's a lot of hands on time with the students. And it sounds like you must be pretty passionate about teaching software engineering to do this kind of program development, and really connect with students, in such small cohort basis, hey?

Emad Mohammed:

Yeah. Actually I feel that it is in my DNA. Every now and then I receive job offer from the industry. And actually, I turn those down, because simply, I like to be around young minds. There is a lot of positive energy going around here. And this is actually something I really like, and that cannot have enough. Teaching software engineering is not only about the courses, the materials, it's all about ourselves. We need to understand ourself, our environment, our student, to put all this together into a wonderful curriculum. That's reinforce the concept that, as a software engineer, we are very important to this society. And the Canadian society is waiting for us to make things different for them, to make sure that they are really in good hands.

Emad Mohammed:

I'll give you an example. There is a high demand now for family doctors, and there is no way to serve all this demand. That's why we employ machine learning, and data mining, to build a medical bot, or a chat

bot, that can listen to you, that can refer you to a physician. This would reduce the burden on the Canadian healthcare system. But this all require a lot of investment in software engineering. And of course, on the supporting staff, or the software engineering, we need to learn about a lot of material related to artificial intelligence, software development, software testing, software security.

Emad Mohammed:

So really, people here enjoy the curriculum. Although it seems a little bit in demanding material, demanding profession, but actually I refer to it, it's just a profession that support all other professions. That's why it requires a little bit of more effort. I don't want to call it difficult, it's not difficult. Since I did it, and I had three degrees in engineering, all of them in software engineering, although my first one was in system and biomedical engineering, but it is nothing but writing software for biomedical equipment.

Emad Mohammed:

Just having this little bit more effort is our concept here. Our student concept. They're really under a lot of work, but they adapt the concept of, "I can do a little bit more. I can learn a little bit more." And their marks, their grades, is actually great. Most of them are in the A+ space and they also have some time for themselves. They know how to do time management. This curriculum is beautiful, and it was handcrafted, literally, to suit the demands out there.

Brenna Clarke Gray:

Well, I was just about to ask you what the student satisfaction has been like in these first few years of the program. I mean, it's growing. So, it sounds like it has a good reputation.

Emad Mohammed:

Well, the first year students actually have some transition. This transition from high school to university level, it's quite shocking. Instead of having your teacher just asking you every minute to do something, or don't do something, here we learn them to become more independent. Because the workplace ethics required people to become more independent and do things on their own. This is a little bit shocking for them, but their degree of satisfaction growing while they go in the program, and this is what we want. Most people rate professors here to be one of the top professors at the university. And they really like the engagements. They really like the efforts that we do for them. And they really like their preparation, and how the preparation start step by step. And gradually, until they graduate. We told them at the beginning, you're here to become our future colleague. We do not consider you a student anymore. You are in a training program. You're going to be trained in a professional way. You have some stuff to take care yourself. We are here to transfer the knowledge from our side, from the professor side, to the student side. They like this engagement, and they become passionate about what we're doing. Every single professor here is really passionate about his profession, his professionalize and ethics. And we try to show this through examples, through a lot of projects, through a lot of lab exercises, and also through a lot of theory. Students are engaged, and their satisfaction is growing in very, very good and satisfactory manner for us.

Brenna Clarke Gray:

And you were saying earlier that they do an independent study project in their fourth year. Is that correct?

Emad Mohammed:

Actually, during their co-op, we advise them to come up with a project idea from the industry, and they bring it into their fourth year capstone project.

Emad Mohammed:

And they do this completely on their own. We just involve to make sure that they are on the right direction. We try to keep them within the lane of the project requirement. But other than that, they're really free to explore whatever they want. To implement it in the ways they like. But we try to keep all the technical skills that we deliver to them intact, within the project. So, they utilize what we explain to them. We do it in a professional way. We review their work. We give them comments. Eventually, again, they'll learn as if it is their everyday work.

Emad Mohammed:

They have a chance to look at the requirement, to analyze the requirement, to come up with a detailed design, and eventually implement, and test, and deploy it. This all the full cycle of the software development.

Emad Mohammed:

And they went and they go through it during the project. And the project is eight months. So, they have a good chance to work together, simulate the workplace environment. And even, we ask them to deploy this on the employer side, and collect feedback from the employer. Literally, this experience is once a life, because it's only one time capstone project, and they enjoy it very much.

Brenna Clarke Gray:

Can you share some of the topics that students have pursued as part of that work?

Emad Mohammed:

Yeah. Actually they build an object recognition system, to identify the quality of some wood board. And this is actually part of the requirement of some company in Salmon Arm, and students are deploying this there at the moment.

Brenna Clarke Gray:

Oh, that's fantastic. That's a real world project, all right.

Emad Mohammed:

Yeah, exactly. We mandate that the project is specific to a specific industry, and this is a industrial idea. We can deploy it out there.

Brenna Clarke Gray:

Is there anything you'd want the university community to know about the program? Whether it's helping to identify possible students, or sharing news about the program. Is there anything you think people don't know about the Bachelor of Engineering, and software engineering, that you wish they did?

Emad Mohammed:

Well, I once tell them that software engineering is everywhere. We're doing software engineering almost every second. For example, right now we're doing software engineering. Imagine that this software that we communicate through are not there. How can we perform this communication? Somebody say, "Okay, maybe we just build a prototype." Yeah, prototype can work, but it'll not work every time. It will not work if somebody join us at the moment.

Emad Mohammed:

A software system is a system designed according to our requirement, and it is meant to stay there forever. And people use it on a regular basis every day. This become part of your every day activity. You use, for example, Google Map every second, to understand where you are, how to go for point A to point B. You use tracking system to track your dog. You track your vehicle. This is software engineering. We are here as a software engineering, bring all the skills that is required to build a software system.

Emad Mohammed:

This is include engineering skills to design system, and analyze system. Computer science and algorithmic skills, and also some mathematical and statistic skills. Imagine all these skills are in your toolbox. Your probability, your chance, to get a job, compared to any other graduate, is at least it's three times. Because most of other graduate focus on one dimension.

Emad Mohammed:

These are people working only in engineering, people working only to build the prototype, in computer science, people know how to do some mathematical manipulation of some phenomena. But software engineer is a kind of multidisciplinary field, require engineering principle, computer science principle, and math and statistical principle. It only require a little bit of more effort. And at the end of the day, people will get at least double the salary of any other graduate. And they'll have a chance to get that P. Eng. license, professional engineering license, that will double their salary, because they become independent, as they can provide, provide service to the public in independent way.

Emad Mohammed:

I want people to understand, software engineering is a profession that's going to last. Professions that is evolving at a very high rate. I'll give you an example. We have about a hundred universities in Canada, and suppose that all of them produce software engineers. All of them have software engineering program. By 2025, we'll be in short of 150,000 software engineering professionals to fill positions out there. This is only in Canada. Imagine in the States, imagine in Europe, everywhere else in the world.

Emad Mohammed:

This is a profession where students need to invest time and effort. And believe me, since I did it, everybody can do it. I came from very, very different culture. I came from different disciplines, and I earned two degree in software engineering. And I cannot have enough actually. That's why I'm here at the university, try to educate other students. And I hope they take this advantage.

Emad Mohammed:

This is perhaps once a life, where we have small cohorts, but we are growing very fast. I want the students to join us, learn about software engineering, and become professional engineers, one day.

Brenna Clarke Gray:

You make it sound very dynamic, and very engaging. I have to tell you.

Emad Mohammed:

Thank you so much. This is my profession. This is in my blood, and my DNA. I can talk about it 24/7. And again, I wouldn't be able to describe the whole situation. But how software engineer changed my life, it is amazing. I completed my first degree in 1991, and I start my second degree in 2012, here at the University of Calgary. And I did it, my master in a year, my PhD in less than three year. All in software engineering. And I really want to do more, but actually there is no more degrees out there. That's why I'm at the university try to talk to students, try to motivate them to join the industry. I want more. I want more of this. And I hope one day I should be able to guide many students for their professional engineering experience.

Brenna Clarke Gray:

I have a question that's really just mostly personal interest. My primary research area is ethics of how educational technologies are applied and used. And so, I'm always curious about what students learn when they're learning the nuts and bolts, and implementation, and creation, of these kinds of tools that go on to be implemented. I'm always just curious about whether, is there a component where they learn professional standards and ethics as part of their course requirements in a degree like this?

Emad Mohammed:

Actually, in the first year, we have two design course, engineering design principle. Part of the engineering design principle is to explain to them how to become a professional engineer. How to follow laws and ethics, and what is the code of, and the ethic, that we need to follow. We demonstrate several cases of breach, and then how to judge it, how to defend it, how to avoid it actually. And we give them a lot of behavioural practice and situation. Over these two courses in the first year, they'll learn how to move from being so casual about their profession, into a little bit toward professional engineer. We have ethics, we have a little bit of how to create the situation in a good manner, in a good phase, how to support employer, how to support employee. We teach them that they are the safeguard for the community. They have responsibility. They have some availability to show that they learn, and they can identify, good practice. They can avoid bad practice. And also they can report the incident to save the society. Public welfare, and public health, is paramount for our profession.

Brenna Clarke Gray:

Fantastic. That's really good to hear. I'm just glad to know that. I think that's everything I had to ask you, Emad, today. Is there anything else you want to share with us before I let you go?

Emad Mohammed:

Well, I really want people to come and talk to us. I hope that I can create a bridge from the high school, starting grade, let's say 10, 11, 12, to show them that how software engineer is a profession for them. Most of the high school students under the impressions that, let's take the easy bus, let's graduate, and after graduation we will learn. Actually, this is not going to work, because simply, you need to learn. You need to have a good foundation. And software engineering is going to give you the foundation that you can build on top of that. This thing is missing out there.

Emad Mohammed:

And I need everybody help to communicate the message to people in the high school, to Principals, to parents, to promote software engineering in the society itself. Once we did that, we should be able to have more engineers, software engineers, and fill the gap, and become... This nation, our country, Canada, needs a lot on this dimension. And I hope, one day, I can contribute much to the software engineering as a profession. And also as an educator at the university level.

Brenna Clarke Gray:

It's very inspiring. You make me want to learn more about software engineering, so that's great. Thank you so much for your time today. We'll include the website and contact email and things in the show notes. So, people know how to get in touch with you for more information.

Emad Mohammed:

Absolutely. And I'll be happy to answer any questions.

Brenna Clarke Gray:

Take care.

Emad Mohammed:

You too. Bye.

Brenna Clarke Gray:

So, that is it for season two, episode 24 of You Got This!. As always, if you want to write to us, you can email me. I'm bgray@tru.ca. And I'm also on Twitter @brennacgray. And in both cases, that's Gray with an A. All of our show notes and transcripts are posted at yougotthis.trubox.ca. And of course you can always comment on individual episodes there.

Brenna Clarke Gray:

I'm going to leave you today with a Tiny Teaching Tip. One that's for both you and your students. This is actually the exact right moment to take some time to do some reflective practice. I know, I know, I know. You're like, "Oh my god, Brenna. We have exams this week. Are you kidding me with your reflective practice right now?" I know. But oftentimes by the time the dust has settled on the semester, the kinds of things that you probably should be reflecting back on, particularly when it comes to remembering the strengths from your semester, those can fade away, especially if your brain is like mine and you tend to catastrophize.

Brenna Clarke Gray:

It's a great idea now, sometime this week, in one of the brief lulls that you have between exams, and stacks of marking, to try to reflect on what went well in each of your courses this semester, so that you have a list of things to really hang onto. We can tend to, when we revitalize our courses, term over term, throwing the baby our with the bath water. Particularly in a term where I know a lot of us have felt a tremendous amount of anxiety, and uncertainty, about how things have gone.

Brenna Clarke Gray:

I really encourage you to take some time to do some reflection now. And I also encourage you, if there's space. And I know, I know, I know, it's late in the term for me to raise this, but, can you add a reflective question to your final exam for your students? Even just an open-ended question, that asks them something like, "Is there something you studied or learned for this course that I didn't ask you on this exam?" That can be really empowering. It can also help you see where your students are prioritizing learning material. But also just asking them to reflect on their learning. Even for bonus points, it can be really helpful to remind students that the journey isn't just about the grade they get at the end of the term, but about the process, and everything they've learned along the way. Wow, that was cheesy, even for me.

Brenna Clarke Gray:

All right, folks. I'm going to call it there. Thanks so much for listening and I will talk to you next week. Best of luck, and happy marking. My heart is with you all. Take care. Bye bye.