**Dr. Tristan Denley – Ōritetanga Learner Success Conference, August 2019**

[MUSIC PLAYING]

It's really been a wonderful conference so far. I know that Tim [Renick] and I have learned a tremendous amount over the last few days here in New Zealand. It's the first time that we've-- either of us have been here. And I think this is really part and parcel of what these events are all about, that we have much to teach one another.

And so I thank you for all that we have learned from you. And I hope that the words that Tim said yesterday and, hopefully, words that I have to say today are useful. So yeah, so my role is at a System Office. So I work at the University System of Georgia. The University System is 26 universities and colleges spread out across the state of Georgia, about 350,000 students across all of those institutions together.

And the universities really spread the whole spectrum of modern higher education. So you may have heard of the University of Georgia and Georgia Tech. They're internationally renowned institutions. You now have heard of Georgia State, which is similarly renowned but in different ways and has really come to prominence quite recently.

But there are 23 other institutions spread out all across the state, ranging from large to small, rural, urban. Some are completely open access technical kinds of institutions, like many of you represent. Others are research institutions or comprehensive. So they span this enormous spectrum of modern higher education.

And my role is to try to find ways in which they can all work together to try to create some kind of an educational ecosystem. I think it's relatively recently true, I think, really, in Georgia that those 26 schools have been-- the thing that joined them together is that they were all part of the system. But if you really ask them, well, what are ways in which you work together with other members of this system? They might have been hard-pressed to actually explain why that was.

Today, we are increasingly finding ways in which we can work together to create the kinds of educational opportunities that really are part of the discussions that we're undertaking here. Does that make sense? So my work, in many ways, has been to try to create the kinds of journeys that we talked about yesterday.

We had several presentations and students too who talked about their educational journeys. And this has become something of the paradigm of talking about modern student success, thinking about creating clear pathways, clear journeys, clear visions, as we've said, that join where a student is to where they're going and where they might go as a career afterwards.

But one of the things that's really struck me over the years is that this isn't at all actually what students think of as an educational journey. It doesn't look like this nice, straight, clear path that leads off into the future, right? It doesn't look like that at all. And that's the trouble that for very, very long, that's exactly the picture that we have had, all right?

So I grew up in England. And I went through the British educational system. And the entire system there was built on this idea that somehow when you're 17 or 18 years old, you can envisage exactly what you're going to do for the rest of your life. And so you will choose exactly what you will do.

And you'll go to university, and off you will go, and you'll study that. And then the rest will all lay out. And for some people, that really is their story. I don't know that I actually anticipated ending up working in Georgia and coming and talking in New Zealand. But it was probably there somewhere.

But for other people, that isn't the picture at all, right? We heard this yesterday, that one of the students, she said, all of my life, I imagined that I would be a doctor. And so that's exactly the reason why I'm now studying journalism, right?

[LAUGHTER]

It doesn't work out that way. And similarly, this clear pathway-- Tim talked about this, that in many ways, the students' picture of what higher education looked like is more like a maze than it is like this. And it's a maze-- if you're a first generation student, a first in family student, you don't know anybody who's navigated that maze before.

And why should you even understand even how to go into the maze, let alone how it is that you could then navigate the maze? And sometimes, you don't even know what the questions are to ask to even understand what the information is to navigate the maze. Does that make sense?

So a lot of what we have to do together is, first of all, to demystify the maze, and then, similarly, together, to create reasonable pathways that actually work for real humans, real humans who anticipate that their life might unfold in this way only to discover that that isn't the way their life unfolds at all. And it unfolds a different way.

And maybe, they anticipated going to college when they were younger. But now, they realise, actually, they come to college when they're not quite so young and come back. And what are ways in which, together, we can create an ecosystem that really works that way?

So my ideas, then, are to recognise, well, what does data have to say, all right? What does data, and research, and evidence have to say about what the large-scale, systematic barriers to student success are? What are the root causes for the kinds of disparity and outcomes that we, sure enough, have had in the United States and which you have here, also, in New Zealand?

And then what are the evidence-based practices at scale that can do something about those large-scale phenomena? What does the data say that those things are? So what I want to do is to spend a few minutes kind of taking you on something of a data journey through those different phenomena in the United States.

And the intention of this is not so much, necessarily, to say, OK, so you can just take this right off the peg, and here it is. Do it exactly the same here in New Zealand. But at least, it should give you an idea of saying, OK, look, if these phenomena exist in Tennessee, and in Georgia, and other schools all across the United States, well, maybe there's something very similar here in New Zealand too. And this is a methodology for us to be able to dig what that might look like out. Does that make sense?

All right, so first thing then, so I'm a mathematician by trade and a discreet mathematician at that. And so the first thing that I wanted to know was the structure of the curriculum. So if we wanted to look at somehow, some way to understand the courses that students take, and how it is that learning in one course somehow enables or inhibits learning in some other course, how would you do that? What would you-- where would you begin? How would you even begin to think about unfolding that?

And so what we did was to say, OK, let's take all of the courses that students have taken over the last 10 years and graduated from one of the universities in the University System of Georgia. And they're all a little dot on this diagram. There's about 35,000 different courses that somebody took at some point to graduate with a Bachelor’s Degree or some undergraduate degree from somewhere in the University System of Georgia.

And you can imagine that some disciplines, some courses just-- they're taken by more students. So you can imagine freshman communications classes or math classes. Those classes are taken by lots of people-- History, those kinds of things. There are other subject areas that are taken by many fewer people. So on this diagram, the bigger, and darker, and greener the dot is, the more people took that class, OK?

But the idea of this technique was not a popularity contest. We weren't trying to find out which courses most people take. Instead the idea was to say, let's see if we can look at the interconnection between these courses.

So courses that were taken together on a student's transcript, so courses that a student took-- all the courses the student took, we're going to join those together by an edge in this diagram. Does that make sense? And then you get this big, complicated network, a network that then captures something of the structure of the curriculum.

Well, so some of you may be thinking, ah, so now I know what mathematicians do on a rainy Saturday afternoon, right? They do stuff like this. And maybe that's right. But it turned out to be a useful thing to do because what you get is something that's called a small-world graph, a scale-free network.

And this is a kind of mathematical structure that mathematicians like me have been studying for the last 20 years or so. And we know a lot about graphs that are like that, structures that are like that. And some of you, I see, are nodding. And you know about that too.

You may have heard of six degrees of separation or the Kevin Bacon game. Have you heard of these things? So this is the same kind of phenomenon. So if we know about these structures in general, well, then we can apply what we know about those structures in general now to exactly this concept of this curricular network.

It turns out that the internet is, at least the visible part of the internet, is also a scale-free network. And what we know about networks like this is that they are fragile in a particular way. Fragile in the sense that if I go in here and I were to pull out, remove, knock out particular vertices, if I did it really carefully, and I chose exactly the right ones, the whole thing would just fall into pieces almost immediately. If I didn't try to choose the right ones, I could be doing it all day.

You can get a feeling of what this might look like. If I said to you, my website went down this morning, would any of you have noticed? Well, that's personally hurtful, but OK.

[LAUGHTER]

But what about if I said that Google had gone down this morning? Do you think you would've noticed?

Mm-hmm.

Yeah, even here in New Zealand? Yeah.

[LAUGHTER]

What about if Amazon had gone down today? Would you notice that? [INAUDIBLE]

Yeah. What about Facebook? Oh, no. Yeah yeah? OK. What about if Facebook and Google had both gone down today? Would you be here?

End of the world

Yeah, exactly. So you get the idea, right? If it's the right thing, and it suddenly disappears, then somehow everything falls apart. Well, if we think about that, now, from a curricular perspective, go back to what we thought of before and said, OK, so which are the courses, which are the subject areas, which are the educational experiences which now lie right at the very heart of what we now mean to be student success?

Then what we can do is to find out exactly what those things are. And that's the place that we should begin. Because if it's the case that those courses, then, are the place where lack of success simply just makes the entire curriculum fall apart, but, on the other hand, actual success suddenly actually breeds ongoing success, that's exactly the place where if we were going to do some kind of curricular reform, some pedagogy reform, some new structuring of an educational experience, those are the places that we should begin first.

So I'm going to surprise you that math, and communications, English are going to be amongst that thing, right? So there's math and English, like the Kevin Bacon of curriculum. They're going to be right there in the middle.

So I want to show you what I mean by that. What do I mean by saying that success in these courses somehow breeds success but lack of success, somehow it really leads to almost immediate failure? So here's what, just to demonstrate this, this is 10,000 students from across the USG institutions.

There's 2,500 students who in their first academic year, they passed the initial math class in their discipline and the initial communications class in their discipline, so the class which teaches them how to express their ideas cogently and clearly. The students to-- the blue students to their left-- so those are the green students. The blue students to their left, they just passed the math class, OK?

And then to their left, there were 2,500 yellow students. And they just passed the communications class. And then you get the idea. To their left, the red students, 2,500 students, at the end of their first academic year, they hadn't successfully passed either of those two courses. Other than that, just for the data people in the room, other than that, the students looked just the same, all right?

So I carefully chose the students so that from a demographic perspective, from a preparation perspective, from a geographic perspective, these students all look the same except for the fact that the green students passed both classes. And the blue/yellow students passed one or the other. And the red students didn't pass either. And now, what we're going to do is watch these 10,000 students over the next several semesters and see whether they go on to graduate.

So you can see them all semester by semester moving. As they gradually drift up the screen, they're amassing student credit hours towards their degree. And when they get to the top, they'll graduate.

And you'll see, there'll be a little bar chart that will appear. So we'll see those students graduate. Let me ask you, which students do you think are going to be the most successful? This is not a trick question.

[LAUGHTER]

Green.

Green, right. I want you to ask yourself how much more successful you think they're going to be-- just a little bit more successful or a lot more successful? Well, here we are now. So you don't have to guess anymore. You can see, right?

The green students weren't a little bit more successful. They were twice as successful as the blue and yellow students. They were twice as successful as the blue and yellow students. And the blue and yellow students each were five times more successful, five times more successful than the red students. So there's a factor of 10 in completion rates and graduation rates between the red students and the green students.

Now, let me ask you, and you don't have to fess up. Were you expecting there to be that much difference? Because the first time I ran this, I had to go back and recheck the numbers because I was really-- I was expecting there to be some difference. Of course, today, I'd seen it before. So I was expecting it today.

[LAUGHTER]

But I was expecting there to be some difference, but really, a factor of 10 between the red students and the green students? Just to hammer it home, you see these big bars of colour. What I did was to have those measure how many students are still in because students drop out.

They get discouraged. They recognise their lack of success. And they drop out. So those big bars, they'll show how many students are left in. Watch how quickly the red students just, literally, bleed out of the system.

This is what I mean by-- this is what I mean by lack of success in this curricular structure, literally, making the whole curriculum fall apart. You see it? So then we don't graduate summary statistics. And you don't either. But this is what the summary statistics look like.

And this is across our entire system. And I could show you for each particular campus what that looks like. And the numbers vary campus to campus. But the phenomenon is just the same everywhere-- that the students who have lack of success in those crucial classes right there in their first academic year, not at some indeterminate time in the future, but in their first academic year, their graduation rate is single digits.

On the other hand, students who have success in either one is five times larger, and both-- doubling again. Now, I don't know about you, but when I'm talking about higher education, I don't talk often about increases in success rates of factors of things, like twice as much, 10 times as much, five times as much. We talk about an increase of 10 percent, or three percent or something like that. This is something that's really different.

Now, here's why I think it's interesting as well to you is, sure enough, that's data from Georgia. And you might think, well, students in Georgia, I mean, they're in Georgia, right? And I was the same.

When I came to Georgia, first, it was like, well, that was students in Tennessee. I mean, but what do Georgia students do? Well, this is, at least, data that I have from the tertiary system about what New Zealand students do, all right?

This isn't all possible data, and I admit that. But this is students who were in an L3 Engineering Bridge program. And the overall pass rate, the overall completion rate from the data that I had across all the ITPs was about one in three students completing that L3 Bridge program, OK?

But look, if you look at only the students who passed the English component, the communications component that doubles. If you look at only the students who passed the math component, also twice as much. And look, if you look at the students who passed both math component and the English component, then essentially all of them pass that whole L3 certificate. Does that make sense?

So yeah, it's a little bit different. And it's not quite the same setting and all of those things. But you can see, the pattern is just the same. The pattern is just the same.

So you might think to yourself, so what are the big barriers to students completing math and English? Sometimes, when I share this in America, I talk about traffic in Atlanta. I don't know whether that's really-- maybe I should say Auckland here. I don't know.

[LAUGHTER]

But this is-- what turns out to be the case in the United States is the way in which we have structured enabling students to be successful in math and English classes when they come to university or college not so good at those subjects, not so well prepared, right? Because the reality is-- and everybody knows this in the room-- if you come to college and you're already good at those things, well, guess what? You're going to do just fine.

So the only interesting place is, well, how do we work with the students who come not quite so well prepared? What do we do then? Because that's the place where we will actually see the kinds of equity gaps we've been talking about disappear. So I want I talk about the journey of that in Tennessee and in Georgia. And this is this co-requisite idea that's gotten some currency.

What we've done in the United States for a very long time was to enrol students who needed to press this college level math -- our rationale was, you know what? They're not ready for college level math. Look, their test scores are too low.

We should instead enrol them in what we called a developmental math class. It was really a math class where the whole idea was, OK, let's get them ready for college work. Does that make sense?

And so one day, I wanted to ask, well, OK, let's not look at the success rate in that class. Let's look at the success rates of students who begin in the developmental class, and then go through that, and then take the college level class. And then how do they do? Right, what proportion of students who begin in that way in their journey actually pass that credit-bearing math class that we now know is so crucial?

So this is what this looks like in Tennessee. And what you can see is this. So what I've put along the bottom is a measure of preparation. I don't know whether you've heard of the ACT or the SAT here. They're really high school tests that students take in American high schools.

And all you really need to know is that the bigger the number, the better prepared they are. That's what we're looking at. And so these are all students who, because of that test score, they needed to begin in developmental education because of state policy that we had.

And you can see that it doesn't really matter where they are along that preparation level, none of them ended up being particularly successful. Even the best-- those who were the best prepared of them, only about 25 percent of them actually passed that crucial credit-bearing math class. Overall, if you put it all together, on average, only about one in 10 actually passed that credit-bearing math class. That's really not very encouraging, right?

Well, what if we looked the next step up? So the way the policy ran in the state of Tennessee at the time was that students who scored 18 or below had to go into developmental mathematics before they went into the credit-bearing class. Make sense? Students who had 19 or above, they didn't. 19 or above, they just went straight into the credit-bearing class, and off they went.

Well, look, students who had an 18 were half as likely to pass their math class within that calendar year as students who have a 19. If you go and actually look inside as to what those different scores mean, a good way to explain it is that, really, they're a good breakfast different, right? Students who have an 18, if they add some bacon with their breakfast, they'd get a 19, right?

There's really no educational outcome that you can really say, this student is really that different from the other student. And yet if you turn the clock forward an academic year, somehow they're 10 standard deviations apart. Well, that's crazy.

It used to be the case that we used to rationalise this and said, well, this is all about preparation. You maybe have heard that being said here as, well, right? But you know what? This isn't about preparation. This is about structure.

This is about structure because it goes like this. Suppose you have a student, and they were in a class. And the pass rate in that class is 50 percent, right? It can be in somebody else's discipline if it makes you feel more comfortable.

[LAUGHTER]

What are we going to do about that, right? So let's think about what it would be that we might do to try to increase the success rate of that class from 50 percent. And a perfectly natural thing for us to do is to say, well you know what? We'll get them to do this other thing first.

And then they'll do this other thing. They'll be better prepared. And then when they get over here and take the class we want, more of them will pass, right? Which is exactly what we're talking about here. Well, let's try that out.

How much more successful do we want them to be? Right, so they're 50 percent right now. Let's imagine that we were able to increase the pass rate to 70 percent by doing this, OK? That would be worth doing, right? Yep?

Well, to do that, that means they have to take this other class over here first. And if they take this other class over here first, not all of them are going to pass it, right? Because people are human, and so they might not pass it.

Well, how many of them are going to pass this class over here? Let's say, 70 percent, then we only have to remember one number, right? In the middle, between the two courses, sure enough, people may drop out, right? They may drop out. They may move. They may get sick.

There may be all kinds of reasons why, even if they pass this course, they don't actually enrol in the second one, and try, but let's just ignore that for our purpose for our thought experiment. In our-- so perfect thought experiment, we began with a pass rate of 50 percent.

And now, in the new, improved version, students go over here. They take this course. 70 percent of them pass the course and, now, move on into the second class. Now, they're in the class we wanted them to pass. And now, not 50 percent pass, but 70 percent pass, right? So is that better? [INAUDIBLE]

Are you sure?

[LAUGHTER]

Well, here's why I ask the question because let's just track them. Before, 50 percent of them passed this class and were able to move on. In the new world, 70 percent of 70 percent get to move on. Seven sevens are 49, right? So 70 percent of 70 percent is 49 percent.

So in the new, improved version, slightly fewer students get to be successful than when we began. And it turns out that that's exactly what's going on here. It's exactly what's going on here. The reason why the students who have an 18 were half as successful as the students who had a 19 wasn't anything to do with whether or not they learned mathematics, but everything to do with the fact that a whole bunch of the 18 students just failed out before they even got into the class to see whether or not they could be successful.

That was in Tennessee. When we scaled up the idea of, now, enrolling students directly into that class that they needed to take right from the very start, but instead of pre-remediating them, saying, you know what? We need to give you all of this material before you go in there. Instead, saying, you know what? As you're going through it, we are going to provide you with a wraparound structure that supports you through that class that you need.

Well, this is what you get. Overall, that success rate, I told you before was about 12 percent. It goes up to 55 percent. So we moved success rates about one in 10 up to a success rate of about six in 10. That's no small shakes.

And you can see that the improvements weren't only for the students who were at the best prepared end, that there were improvements all the way across. In fact, the greatest improvements were for the students who came in the most weakly prepared. You might say, well, you know what? Students who come in, and they're right at the very bottom, only one in three of them were passing that class. And you're right.

But when we began, only three percent of them were passing the class. I'll take 30 percent over three percent any day of the week, and you would too. Make sense? Just to put it in perspective, the year that we went to full scale across the Tennessee system, more people passed a math class in Tennessee colleges than had in the previous five years combined because of this change.

Now, think back, then, to what I showed you about the curricular structure and how crucial that success in that early material was. That's Tennessee. This is what it looks like in Georgia. You can see, very, very similar pattern.

The red bars are what happened when, in Georgia, we moved to this co-requisite structure. The blue and green bars are the older approaches to remediation using this pre idea of, well, let's first remediate them. And then, afterwards, then they can take the class.

This is what it looked like in math. This is what it looks like in communications, in English, same kind of pattern, really dramatic increases in the success rates of those students. Well, you might say to yourself, well, that's just fabulous. But does it really work for everyone?

Part of what we have been talking about today is, really, this commitment to making sure that education really does function for all learners. So let's look inside. Let's do a little bit of disaggregation and make sure that whilst we know that this overall is producing significant increases, is it producing significant increases for everyone?

Well, so this is what this looks like for-- Tim talked about it yesterday-- Pell students, students who are on federal financial aid, low income students who their average household income is in the $25,000 to $30,000 range. You can see, that chart looks, essentially, the same as the one I just showed you. This is what, similarly, it looks like for African-American students in math classes.

Just to hammer it home, let me superimpose what the other chart looked like. Somebody, once when I was showing this, said, well, you just cheated. All you did was just took the other chart and just changed the title to say African-American students.

So just to make sure you see, this is what that-- you can see, I've superimposed the other chart to say that we have eliminated any equity gap is an understatement. There's literally nothing there, right? This is what it looks like for math classes. This is what it looks like for English classes. And again, let me superimpose that general distribution.

Now, why do I say that there is something, again, to take away for in a New Zealand setting? Well, I think I've shown you that these critical courses - math and communications - they are an integral part of everything that everyone does. They can be just as critical here as they ever are in Georgia and in Tennessee.

Look at this idea of this, what I showed you. First of all, students enrolling in this preparatory math class, and then some of them passing, and moving on into that foundation's math. Notice, that wasn't a bad pass rate, right? Not a bad pass rate, but then when we move on, actually, not all of them enrolled in the next class.

This is what Tim was talking about earlier, that students, for all kinds of complicated reasons, don't do, necessarily, what we expect them to do. So they didn't all go on into the next class. And even when they got there, not all of them passed that class. That's how we get to that what in Georgia was about 30 percent of the students passing in the old model. Does that makes sense, yeah?

So it doesn't all happen-- some of you, I know, are classroom instructors. You can imagine teaching that foundation's math class. 75 percent of your students are successful. And you think, this is going great because from your vantage point, 75 percent of your students are successful. But then when you take that longer view, then you realize that pipeline doesn't work quite the way that you anticipated that it did.

The reason why I want to show you this is because I want to go back, and then look at those L3 Bridge programs because the way that it looks-- we've already seen it—about 30 percent of students pass those. Two thirds of them only, actually, enrol in some kind of a next stage degree program. I don't have the data to know, when they get there, when they're successful already, but we're already down to only 20 percent of those students who begin that L3 program ever even enrolling in a degree.

Do you see the connection? Because it may well be that in our commitment to saying, well, look, when they begin, we'd better make sure that they were really well prepared, that, actually, in doing that, we've actually taken much of the sting out of enabling them to be in college at all. This is what looks like for learners in general. This is what it looks like from Māori learners. And you can see, for Māori learners, it's about half as effective again.

I think there's really something to look at as to whether some lesson can be learned from this co-requisite approach to education, perhaps in a subject-driven way but also structurally in the way in which we build pathways into degrees for students who are less well prepared or less well credentialed. Let me move on a little bit. Go back to this idea of the curricular graph.

I kind of alluded to this earlier, right? So what if we were able to find what I'll call catapult classes. Coursework material that, when students learn it, if we're able to help them learn it more deeply, then we actually increase success rates, so the mirror image of finding the places where everyone leaks out, right? It's saying, OK, yes, it's the case that we like to find the courses where students stumble and fall. What we'd also like to find is the places where, by enabling them to learn more deeply, we can actually not only not enable them to stumble but actually pick them up and cast them into a whole different trajectory. So what are ways in which we might be able to then figure out these catapult classes? So let me try this a little bit.

So first of all, let me take all these different courses, the ones that I just showed you in this chart, and string them all out, right? Well, Tim showed this yesterday, the different grades that students earn in those classes-- this is a freshman communications class. That's the grade distribution on the left. And then on the right is that same kind of impact that was part of what Tim showed you yesterday, that if you earn an A, if you earn an A in that class, you can see you're 37 percent more likely to be successful overall, not in completing that class, but in completing your entire degree, than an average learner.

On the other hand, if you earn a D, you're about, what, 45 percent less likely to pass the entire degree than an average learner. Grades in those courses make a big difference. So what if it were the case that somehow we restructured the learning in that course, we changed the pedagogy, we made some curricular change in such a way that, for the average learner, their learning could be reflected by one grade higher as a grade? Does that make sense?

Well, what would happen then, right? So in other words, everybody moves one step to the left. And of course, well, let's say a student who is otherwise going to earn a C-- in other words, was going to have a success rate about 12 percent less likely than the average learner-- now would earn a B and be about 13 percent more likely to pass than the average learner. That's about a 25 percent swing in their success rate. You see the same kind of thing if they move from a D to a C or B to an A. Every time they move across that spectrum, the increase in success rate is not small. It's of the order of 20 or something percent.

And then we can mix that with the grade distribution to figure out, well, overall, if we were able to make this happen for the average learner, how much more successful would we expect the average learner to be? Does that make sense? So we do that calculation now for every course in every subject on every campus, and you get something that looks like this. Let's have all of those different courses. Now, let me rise them up where, now, the vertical axis is measuring how much impact do we get, how much impact do we get by deepening the learning in that course.

So the horizontal axis is just how many people there are in that course. The vertical axis is how much impact do you get by improving the learning. Now, let's mix them together. What we really want to find is, where are the courses that lots of people take, and there's a huge impact in the learning? So let me finish that out and scale those dots according to, then, which are the courses where lots of people take them and the impact of deepening learning would be large. Now I can run that analysis for each campus.

Again, go back to what we wanted to do before, to say, where are the courses on each particular campus where engaging teams of faculty and thinking differently about how it is that education happens in those courses would have the greatest impact on moving the needle forward, not just simply in enabling students to be more successful in that course? That's a nice thing. But what we want is enabling students to be more successful in that course that results in them being more successful in completing their degree, because what we're about here is people earning degrees of value. That's what we want to do. Does that makes sense?

So now we have roughly 200 teams of faculty all across my system, different teams working on different subject areas, which each, on their particular campus, have that strategic value of moving the needle on completion rates. This is one particular campus, and you can see what those courses are. Again, it's not a one size fits all. It's also not just something where they have to do the biggest bubbles. If you look at this here, they did English Composition 1 and American Government, and there's a General Psychology right there. And this is college algebra, a math class. And you might be curious about this light blue one right there and say, well, that one looks bigger than those other two. Why didn't they do that one?

That was the second semester of English. On that campus, they made the strategic decision to say, you know what? We'll do the first semester of English first. We'll figure out what we're doing there. Then we'll go on and do the second semester of English, right? We're not just going to overtake the entire English department all at once, just do it in manageable chunks. This is, again, a way in which we can guide our strategy, but it's strategy where we can, on a campus, make the largest impact that we can most effectively.

All right, so I've talked some about ways in which we can impact learning and the curriculum. I want to carry that on but in a slightly different direction. Academic mind-set, non-cognitive kinds of aspects of learning-- we're now learning that those things have as much impact on overall student success and completion as preparation ever did. One of the things that we've done is create a large-scale academic mind-set survey and then deliver that all to our incoming freshmen, questions asking about grit and perseverance and purpose and growth and fixed mind-set, if you're familiar with those kinds of ideas, questions that talk about the attitudes of their family or their motivations as to why it is that they went to college, or are they food insecure, or they experienced homelessness, or all kinds of aspects of what it is that their experience of a student involves, asking them about their impressions of how their faculty feel about them.

And then what we've been able to do is to use that data together with outcome data, whether or not they were successful in college, to be able to then find what are the non-cognitive aspects that have the greatest impact on either enhancing or inhibiting their likelihood of being successful. Does that make sense? So you can see what these things are-- perceived purpose of coursework, so understanding why it is you're taking the classwork that you're taking. Well, why am I in this class, right? If I'm taking this math class, it would be useful to know why it is that I'm taking this math class rather than another one, right?

If I don't see that, then it may well be that I'm thinking, OK, [INAUDIBLE] have you ever heard people-- I guess I'm a mathematician. I can beat up on my own discipline. Have you ever heard people somehow say, I don't see when I'm ever going to use any of this math? Have you ever heard that? Yeah, and sometimes I'll make a joke and say, well, yeah, you will use it again. One day you will be a parent, and your children will be in high school, and you will use it then. And that may be a good enough reason to do it, but probably not, right? It really ought to be the case that, as faculty, we should have a good old, hard soul search and say, why is it that we are getting students to learn this mathematics as opposed to some other kind of mathematics?

So purpose of course work-- and just because I told you so is not a reason, right? Feeling connected to your institution, feeling like you belong, feeling like you're part of the-- I mean, if there's anything that we've learned about life in New Zealand, that this is an enormously crucial part of everything that happens here, so feeling that you are connected to what is happening here. Believing you're capable of learning the material-- so this is Carol Dweck's work of growth and fixed mind-set, believing that you are able to learn this and people like you are able to learn this material.

So often it's somehow built into the common experience, in the United States, anyway, that people say, oh, I just can't learn that. I'm just not a math person, like there's two types of DNA in the world, right? There's people who are genetically predisposed to learn math, and others who just-- there's nothing they can do, right? But this is what they believe. And do you think that, in any way, it advantages you to learn material if somehow you feel like there's no way I can learn this? There's nothing that I can do to overcome this.

Confidence interacting with faculty and staff, making sure that, as you reach out-- and you saw how crucial that faculty-staff interaction is in much of what Tim talked about yesterday. When students are sitting down with an advisor, if they don't have confidence in the way in which they interact with those people on your campus, much of the kinds of interventions you'll create simply will be dissipated. And then, lastly, grit and perseverance-- this is less about, you know what, when the going gets tough, the tough get going. That's sort of true.

But my suspicion just for your students, just like our students, is students who are in college-- you already know they're pretty gritty, because they're in college. And they've had to overcome quite a lot of things to get there at all. This is more about recognising that life has a habit of just eroding the grit that you have. Have you ever gotten to the end of the day and said, if there's just one more thing, I don't know that-- I'm glad it's just me. That's really great. Well, that's called life for many of our students.

And so they get to the end of the day, and that's when they sit down to try to do the kinds of learning that we need them to do, this deliberate practice kind of learning, trying to tussle with some difficult concept and try to wrestle that to the ground. That's when they need their grit reservoir, and that's when they don't have it anymore because they've used it up in all kinds of ways, some of which we have inadvertently put in their way, because we have some hold on their account, or they've spent half the day trying to sort something out with financial aid office.

So are there ways in which we can recognise that? I'll show you what this might look like. So we asked students about the purpose of their math class they were taking, go back to what I was saying earlier. We asked them whether they thought that their math would be useful in their career, we asked them whether they thought the math was just useful, and we asked them whether or not their math would be useful in their future. So you can see this growing skepticism. Is it going to be useful in your career or not? If it's not useful in your career, maybe it'll be useful sometime in your future. Or maybe math just isn't even useful at all, in your viewpoint.

And what you can see is that the greater the skepticism that students have about the utility of the math that they're learning, the less likely they are to successfully learn it. And just, again, you can control here for preparation. So you can see, it's not just the case that students who are better prepared somehow magically think the math they're learning is more useful. I actually even went in to look at the grade distributions, not just the pass rates, because some of you might say, well, what about the grade distributions?

This is those students who were skeptical that math is even useful, and this is those who think it'll be useful in their future, and then not their career but their future. And then, look. These are the students who think it'll be useful in their career. The greater the skepticism that they have about the utility of the math that they learn-- there's nothing special about math here, it's just [INAUDIBLE] true about the utility of what it is that they're learning-- not only is the pass rate higher but even the depth of learning that is going on here.

And you think about yourself, right? So think about the things that you've learned yourself over your life. It's clear the things that are utterly useless are the things that you have spent the most time trying to understand, right? You devoted yourself to understanding things that have absolutely no utility in your life. No, of course not. But it's the place where you see that you have the greatest utility. Those are the things where you find the greatest reason to spend time trying to master those things.

And students are just the same. We've just not seen it in that way before. And the tragedy is that there is no reason for us to imagine that the things that we're teaching don't have utility. It's just we never take the time to explain to students why it is. Instead, from their opinion-- and certainly this is true in the United States-- so often they're taking courses "because they made me." And "because they made me" just doesn't cut it.

This goes back to-- and you saw Tim talk about this from Georgia State's perspective and this idea of meta majors. We similarly, across the whole system now, have moved to this idea of, right from the very start, enabling students to make a purposeful choice about their program, a purposeful choice about their program. Why? Well, how can they know the purpose of the coursework they're taking if they don't understand what the purpose of them being in college at all is?

So how is it, then, that we can enable students to make that choice? And the reason why we've gone for this idea of academic focus areas, or meta majors-- and maybe they're discipline based, or maybe they're thematically based, doesn't really matter-- is because, as humans, we run the risk of what's called choice paralysis, right? So behavioural economists, like Barry Schwartz, have really recognized this phenomenon that, as humans, when we're faced with lots of different choices, very often we will just look at those choices and go, that's just too many things for me to choose from.

And if one of the options is, well, just don't choose, lots of people will take the, "well, I just won't choose" option. This really struck me when I was listening yesterday. You think about that from the perspective of-- and I forget the second student speaker, where she talked about how she wanted to be a doctor only to discover later that she wanted to be a journalist. In many ways, she was choosing from different disciplines that she was familiar with that she had heard of, that she could somehow identify with.

She talked about her story and how she saw doctors helping her grandmother, and so she had every reason to be a doctor. And yet, somehow, every reason to be a doctor doesn't mean that a doctor is what she should be, right? And it really struck me as to, on the one hand, how often it might be the case-- and you know this much better than I, it's the reason why I want you think about it-- how often it might be the case that students enter tertiary education here in New Zealand really thinking that they want to be this, only later to realize that they actually really want to be that. And now they're somehow stuck in this, so do I give that up or not, or how do I get from here to there, all those kinds of things.

That may not necessarily even mean that they're at the same institution, let alone in the same department. And how easy, then, is it to take the education they already have and move it and transfer it to some other setting? Equally well, how many students are there in New Zealand who don't compellingly enough think that they want to study some particular thing, right? There's so many things sitting out there that they're like, well, I don't know. Maybe I want to do that, or I want to do that, or I want to do-- what? I mean, I don't know which of those I want to do.

And that lack of decision is enough for them not even to be in higher education at all, because they don't compellingly enough think that they want to do any one particular thing. Does that make sense? So to what degree are there students sitting out there who really could be part of tertiary? Do you somehow enable them to make that choice, again, recognising that choice is a hard thing for us as humans? Along those same lines, how crucial it is that, right from the very start, students feel that they're studying what they thought they chose, not, as is so often the case, we come in and much of the initial material doesn't really have any connection. It's just initial material.

All right, the last thing I want to talk about is the intensity of study. And we heard this a little bit yesterday. Many of our students who study part time, many who study full-time in the United States—15 hours is recognised as being full-time study. And then, as you can imagine, less than that is part-time or more part-time or very much more part-time. They have implications about financial aid and so on. What's interesting is, again, the connection between success rates and intensity of study.

Here, I've disaggregated those success rates by the number of hours that students took in their first semester in college. And I've disaggregated also by preparation. And you can see there's no level of preparation-- there's a myth going around, always, that less well-prepared students would benefit from having a lighter schedule. In our system, there is literally no evidence of this being the case. There's no level of preparation where students aren't advantaged by having a fuller schedule.

More than that-- and we actually did a full-blown so-called propensity score study that not only takes into account preparation but also race and income and gender and all kinds of other demographic factors. There is no situation where a student isn't advantaged over their statistical twin, in the Georgia system, by being able to take a fuller schedule. Now, here's the question. Why? Why is that true? What is it about part-time study which somehow is so strongly correlated, even causal, around students not being as successful?

And more than that, to what degree-- and we believe to a great degree the reason why many students are more part time than we would like is that they're more part time than they would like, and it's because of us that they are that part time. It's because of when we offer the courses and the capacities of the courses that we offer and the modalities. And sometimes they need a course, and we don't offer it in the spring, but they need it in the spring, and all those kinds of things. Does that make sense?

And so what are ways in which, by changing the ways in which we do business, we can actually enable many more students who right now are part-time to be fuller time than they are currently? And you can see that they are significantly advantaged by being more fully time. One of my big takeaways from yesterday was to think, well, we talk a lot about people who work through college. And it's really been an American paradigm for a long time. They work their way through college.

What's astonishing is that somehow we have never made peace for deliberately constructing a way in which someone can work and learn at the same time, that so often from our perspective, they are a learner, yeah, and we have to accommodate that work part. And yet, somehow, we should do so much better in recognising that this is a full package, that there are going to be people who are working and there are people who are learning, and somehow creating that work and learn together. This is a package which we really need to put together.

But either way, again, we have seen the problem, and it is us. It's ways in which we construct what we schedule and when we timetable it which so often decide so many of these things. All right, so to pull it all together then, I've talked now about a lot of different pieces. In Georgia, what we have done over the last two years is to take all of this together and called it, the strategy, our Momentum Year. And the Momentum Year now has these five aspects of it, first of all, making a purposeful program choice. I've shown you the implications of that.

Students who come into US colleges and don't have a strong understanding of why they're in college-- more than half of them drop out before they figure it out. So making a purposeful program choice, knowing why am I in college, where am I leading, what am I looking to achieve through this, surrounding that, as you saw yesterday, with strong information structures about what kinds of careers are connected with these kinds of learning, making a purposeful program choice. Creating a productive academic mind-set, understanding how it is that these different kinds of non-cognitive factors actually impact the learner, and what are ways, what are strategies, what are things that we can do to enable students to have a more positive academic mind-set about themselves as learners and the learning environment that they are in.

Gaining momentum along a clear pathway-- lots of pieces to this, but is it really true that when a student comes in, that they can actually see that curricular pathway that takes them from where they are to where they need to be? What if that curricular pathway involves them moving from where they are now to another university or to another department? Can they see how that would play out? What does it mean, then, to gain momentum along that, right? So is it the way in which we schedule the courses which somehow inhibits students being able to make good, clear momentum along that pathway?

Surrounding them and monitoring them and recognising when it is that they trip up along the way and intervening to make sure that we can really catch them before they really fall-- gaining momentum along a clear pathway. Attempting nine hours in their academic focus area, so deliberately constructing the curriculum in each discipline in such a way that, right from the very start, they get a good, clear taste of what it is to study, what it is that they thought they came to do, right? And sometimes they won't like it, right?

Sometimes they really thought that they wanted to be a teacher, because they like children, and then they realise that they like their own children. They don't like other people's children. You heard this yesterday with the student who spoke, right? She wanted to be a doctor, only to discover that she really didn't like blood. This happens. So this is important. But equally well, there are some of us in the room who, the very first moment that we got bitten by whatever the bug of our discipline was, we never recovered, right? Well, enable students to have that experience.

And then, lastly, completing initial catapult classes in their first year-- what are the courses which are the game changers in that first year? Yes, it's math. Yes, it's communications. But there are going to be other things, too, and making it our business that, structurally, we can enable as many students as possible to have that early success right from the very start. That's our Momentum Year. Let me make it clear. This is not a menu. I didn't come to our 26 campuses and say, here is a menu. You pick and choose. Which of these would you like to do?

One of these probably just-- maybe you think, oh, yeah, that really would go well on our campus. We'll do that one. No, it was a recipe. It's saying, how does each campus now think about all of these strategies together as a cohesive and coherent whole? Because you can see that each of them plays off the other in a really important way. So that's what we've done, and we've done it over 18 months. First of all, we brought leadership teams together in what we called our Momentum Summit, where leadership teams really strategised out how it is that that Momentum Year strategies-- what would they look like on your particular campus?

Because you know what? They're going to look a little bit different from somebody else's campus. They need to be put into your campus context. But each of those phenomena exists on everybody's campus. We need to build that Momentum Summit and work with particular sets of faculty, understanding how do you teach math and English in this core requisite format and understanding how it is that you do advising in the kinds of ways that you heard Georgia State doing that and other kinds of admissions and all those kinds of things.

Faculty learning communities, where we brought together groups of faculty of about 1,500 faculty who were in small learning communities, or about 10 or a dozen faculty working together to understand, what do these different kinds of Momentum Year aspects look like in my classroom on a daily basis? How should I be thinking about that? And then, lastly, Momentum Summit II, which happened just a few months ago, where we brought together 500 department chairs and deans to think about, OK, through this new paradigm lens of student success, what does that look like when I'm leading a department? What does that look like when I'm leading a college? How should I think differently about my role? Does that makes sense?

So all of those pieces together, then-- that's been our approach. And as I say, we've now put that in place in Georgia to turn the clock back to Tennessee, where these ideas really found their beginning, began back in 2013 when I put all of that into place in Tennessee, so the kind of impact that we've seen. In the community colleges that are like the ITPs in Tennessee, we saw 61 percent increases in completion rates and about 25 percent increases in the universities. But again, for African-American students, the increases were about double that. All this has happened, as you can see, in a relatively short period of time.

So that's the end of my story. I hope that it's the case that you take away from this-- not that I'm expecting you to somehow take the work that we've done in Tennessee and Georgia and take it off the peg and go, there you go, but instead to think about those design principles of recognising, what are ways in which we can take these fundamental structural elements of tertiary education here in New Zealand and then, together, construct something which you cannot really construct apart? But it's going to have to be something that's holistic, something that really encompasses much altogether. So with that, I thank you. I'd be happy to answer any questions.

[APPLAUSE]

Kia ora, Dr. Denley. Thank you so much. And we do now have this opportunity for about top of 10 minutes to have some questions answered. So if you do have a question, kei konei ngā hopuoro.

Kia ora. Catherine Moran, University of Canterbury. Thank you very much for that presentation, very inspiring and taking lots of notes. And I see people around me doing the same. I was wondering if you could give us more information about the co-requisite pathway. I'd be interested to understand that better.

Yeah, so the idea with the co-requisite pathway is really to take these early mathematics courses or English courses, or we've also done it in early reading kinds of courses. So these are, if you like, the fundamental building blocks and barriers that many students face, these early introductory material. And where in the past we might well have said, OK, we're going to put the prerequisite before this-- we're going to say, OK, for you to be successful-- you're coming in less well prepared-- we'll put this in first. That will allow you, then, to have the preparatory information.

Instead, we enrol those students directly into the course that all of the other students are taking. But those students also, then, are enrolled in another course, another supplementary course, a support structure along the way. And so this course is the credit-bearing courses. This is the one that they have to pass. This is the grade that really actually enables them to be successful in their degree. This course is a support structure along the way that enables them, in parallel, to get support as there are things that they find challenging or difficult.

What's surprising is that what we've always thought in the past was, well, OK, if we do that, we'll just be kicking the can down the road. They'll do OK in this class, but then they'll trip up when they get to the next one. Now, we have data to show that's completely wrong, that actually they do just as well, actually often much better, in subsequent classes than they ever did before. But of course, as I've shown you, many, many more students are successfully moving on down that curriculum. So thanks, yeah.

So it's actually slightly outside, adjacent to--

Yeah, so this is the word, "co-requisite." That's where it comes from, the use of-- you do it at the same time.

Yeah, but it's another hour or so of their day.

Exactly right. And so sometimes it’s timetabled as a lab experience, sometimes as a-- sometimes it's actually a separate class that's timetabled separately. But either way, as you say, in many ways it's requiring students to set aside time that you always would have wanted them to set aside time to understand the things that they find challenging and then deliberately providing the support to help them understand those things.

Kia ora. We have a question over here.

Tēnā koe. My question's got to do with catapult courses. And I noticed on the slide in your presentation you had English literature, or something like that, but then also American history. And I'm just wondering, in the context of Aotearoa New Zealand where we're dealing with so many complex issues of colonisation, how we could be utlising catapult courses that are actually around cultural identity, Te Tiriti, social inequality so that, actually, our students can see their story rather than being exposed to--

Oh, I think that's a fabulous observation. I mean, the methodology that I showed you was focused on where are the places where you see the greatest increase in completion rate. I also ran a similar kind of analysis for where are the courses where we see the greatest opportunity to close outcome disparities. And you can get, actually, a similar set of courses. But really, this metric of completion could be anything that you want it do. And I think there's a fabulous opportunity for you to say, oh, so where are the catapult classes where we have the greatest opportunity to deepen cultural understanding? I think that's a really great idea, yeah.

And as you say, the utility of that-- so for us to build as a society our understanding of how that would be helpful.

That's right.

Now we have another patai over here.

Kia ora Eru, kia ora Stacey, tēnā tatou i te whare, ngā mihi nui ki te rangatira.

I really liked the use of the catapult course. And for rangatahi we know that level 1 algebra at high school is a catapult course, where two thirds of them pass, move on to University Entrance, and they're sorted. But our key issue is that half of our kids don't even sit it, because they're streamed away into foundation-level courses. And what happens, we know from their voices-- that's a signal to them that the teacher thinks I'm dumb, and in the worst cases, teachers will even say that Māori and Pasifika are good with their hands, not great with maths. And I really wanted to ask in terms of the data and how that really provoked questions in terms of your educators, in terms of bias, racial prejudice, and whether they really shape their orientation towards students of colour in different ways based around some of the insights from the data.

One of the things that we know about the traditional way of working with developmental education is-- so students of colour, African-American students, Hispanic students, have historically been about three halves as likely to find themselves in developmental education. And when they get there-- I've already shown you that only one in 10 were successful. So this was a significant barrier, significant root cause for the kinds of disparities that we've seen. And it sounds like you're putting your finger on at least a place for us to explore that same kind of principle.

But if you look nationwide in developmental education, more students drop out of developmental education than ever complete it. And much of the reason when we ask them why that is-- it's exactly as you just described, that these are students who have fought and overcome significant barriers to become part of higher education at all, and when they get there, the structure is basically saying, you know what? We just don't think that you're college material. And they may well have somehow worried about that themselves just because of the way in which society is set up.

And so they go to college. They feel like, you know what? This is going to be a hard climb. And then the structure of the institution is saying, yeah, oh, we're worried about that, too. And then they drop out along the way. I think you're exactly right. There may well be opportunities to really change that whole mind-set, partly by the structure of the way in which this goes on. I hate to harp on this L3 Bridge Certificate but I think it's really striking. It's about 50 percent of students drop out of those certificates. They don't complete them. They just drop out. And I wonder whether it's a similar kind of phenomenon happening, so it's an existential kind of issue, not a curricular kind of issue.

A component of your korero and that data set, that perception attitudinal data set that you talked about, because for iwi working alongside tertiary institutions and trying to reshape the environment so our Māori learners can come in as Māori and be successful-- really interested in how you collect that data set and how it's used to inform a culturally sustaining environment that's going to better our Māori learners. What are the challenges that have held, I guess, the current status quo in place, and how have they been overcome?

I mean, this is a research project that's underway and ongoing. And we are really at this bleeding edge of learning about this. What we did was we worked with some cognitive psychologist researchers, a group called the Motivate Lab of the University of Virginia. And together with them, we constructed this survey. It's about 80 questions. And it contains a lot of those standard psychometric academic mind-set measures that have become established in the field.

And then we simply ask all of the incoming students across the system to fill out that survey. It's completely voluntary. They don't have to do it, but many of them do. The last time we did this, we had about 15,000 responses. Next year, I think the last that I'd heard, we were already halfway to that, and the semester hasn't even begun. So we will get more this coming year. And then what we're doing is then taking that data together with information that we have about the students, the grades that they get, whether or not they retain, all of those kinds of other things, to then be able to see, right now, are there strong correlations between those aspects of their identity as a learner and then what they do in the classroom?

I think it'd be a really fascinating undertaking here to see, well, what does that look like in New Zealand? And to what degree do we see slightly different kinds of learner identities in different settings? We had no idea about this. I mean, one of the complete, really, unknown aspects of this was, so if we now look at the geography of this student perception in different settings, in our elite schools compared with our open-access schools and our rural schools compared with our urban schools, will we see things that are the same? Will we see things that are different?

There's no right or wrong here. It's just we need to know how it is that students feel about themselves and how they interact with the learning environment around them so that we can then better tailor the learning environment that we're providing to them. This is not a problem to be fixed among the students. This is, how can we change to better interface with the student body that we have? Does that makes sense? And so the only way to know is to now create this measure, to actually see and inform ourselves about what it is that we might do. So I think it would be fabulous to have here. I'd be happy to have that conversation. Yeah.

We hear from students saying that support from their whānau or their family was critical in their success. Have you done any work on or gotten any data on the importance of support from whānau?

I do. And so this is actually very brand new data. And something that we've really found out by doing this large-scale survey-- we asked students about how it is that they perceive the support from their family, from the community around them, and motivations for why it is that they went to college at all. And we find something interesting, which-- so this is right now. We have found this phenomenon. Now, part of what we have to do is to understand what does it mean and how we might respond to it.

So we talked some yesterday about the distinctive learner profile of African-American men in the United States and ways in which that might be a shared learning perspective and ways in which it might simply not be, that it's just simply being a learner. One of the things that we found was that twice the proportion of African-American men say, you know what? My family is skeptical about why it is that I'm in college. My family doesn't really think that being in college is a valuable thing for me-- twice any other race, gender combination, so twice African-American women.

So if you look at the proportion of African-American women who say, you know what, I don't have the support of my family, it's about one in 10. If you look at the same question for African-American men, it's about one in four. Now, part of what we have to understand is, so what is the cultural context of that? And what are ways in which we might be able to now better prepare African-American men who face this challenge to be able to better explain to their family unit around them why going to college is so crucial to them as a person and how they see that this-- does that make any sense?

Now, this is not a self-fulfilling prophecy. I mean, we talked about this yesterday. I don't think the right response is now to take all African-American men and put them in a room and say, OK, we need to talk to you about the fact that you-- because that's not true, right? But it is the case that we now know that somehow that particular challenge is more prevalent in the African-American male community than it is, for instance, in any other racial or gender group.

And so, also, we need to understand, well, what's the cultural context that somehow is leading to that? And are there ways in which we might be able to address that differently? So again, some of these things we're just unearthing these phenomena. One day, we will also have, we hope, good interventions to be able to find some way to help, yeah.

Thank you.

Kia ora, Tristan. And I just want to say thank you, especially. We throw words at you like whānau and korero and you pick it up so quickly. And we really appreciate it. That's why we'd like to do a waiata for you, e tū.

[MUSIC PLAYING]