# Transcript

**Thought Leadership series: Future of Education, Student Agency, Creativity and Artificial Intelligence (AI) with   
Ronald A. Beghetto, PHD**

ANAM JAVED:  
Alright, let's get into it. Hi, everybody. My name's Anam Javed and I'm the Manager Learning within the Teaching Excellence Division here at the Academy. We welcome you to today's presentation, which is a part of the Academy's Thought Leadership Series. We appreciate and recognise the work that you do for your students, for your colleagues and for your communities to provide teaching and learning of the highest quality. And we do thank you for privileging this time for your professional learning at the end of your day on behalf of the Academy. On behalf of the Academy, I also further acknowledge the traditional owners and custodians of the many lands we are on today. I'm on Wurundjeri land of the Kulin Nation, and this is land that was never ceded. I pay my respects to Aboriginal and Torres Strait Islander elders, past and present, and I extend this respect to Aboriginal colleagues who are here with us today. We recognise the continuing connection to land, waters and community. It is now my honour to introduce you to our guest today, Ron Beghetto, who will discuss the future of education, supporting students' creativity in the age of artificial intelligence.

Dr Ron Beghetto is an internationally recognised expert in human creativity and the possible extensions in educational settings. He earned a PhD in Educational Psychology from Indiana University with an emphasis in learning, cognition and instruction, and currently serves as professor in the Mary Lou Fulton Teachers College at Arizona State University. Dr Beghetto has received recognition and numerous awards for excellence in teaching. His work explores teams such as using generative AI as a partner in possibility thinking, preparing young people for possible futures, supporting creative agency development and democratising creative educational experiences. You will have the opportunity in this webinar to post questions throughout in the chat over the course of the presentation, and also for 15 minutes at the end when Ron will answer your questions. Ron will also be able to answer your questions as we go through the webinar. So please keep the chat box open and keep the questions coming.

It's now my pleasure to hand over to you, Ron. Thank you.

RONALD A BEGHETTO:  
Thank you. And thank you all for joining us this afternoon. I'm sure after a very busy day. And greetings from the high desert of Arizona. It's 11:03 pm here, so I'm enjoying this late night with you all. So, I'll give you a quick overview of some of our objectives and then we'll dive in. And again, as Anam said, please do drop questions or comments at any point. I have my chat window open as well. And I would be happy to field any questions. So we're gonna be talking about 3 large things here. The 1 is really the possible that we're starting with, which is really about moving from what is to what could be. And kind of learning strategies of how we can foster this mindset of what could be in our colleagues and most importantly, our students to encourage them to envision and work towards positive futures. We're gonna be talking about creative agency and how we might design learning environments and experiences in those environments that promote student agency and creativity, allowing them to kind of personalize meaningful educational experiences now and into the future and then we're also gonna be talking about responsible.

So, how can we incorporate principles of responsible human creativity? In partnership with artificial intelligence and use it in the curriculum as a way to leverage its benefits and minimize its potential risks. So, these objectives align nicely with the Academy Leadership's Excellence Framework. It aligns with the dispositions capabilities and domains. And it also aligns with your new framework for Gen AI schools, which really emphasizes responsible and ethical use of generative AI tools in ways that benefit students, schools and society. OK, so let's dive in, let's move from what currently is to what could be. So, when we think about education, I think it's really important for us as educational leaders, educational staff, teachers, and I think even those of you that are parents to think about what kind of education do we owe to our children, to our students, to young people generally. And I'd just be curious if you have a thought, you can just drop it in there. How would you answer this question?

It doesn't have to be very verbose. I know it's the afternoon, so you can be very brief and succinct. I'm just kind of curious what your thoughts are on how you might answer this question. What kind of education do we owe to our students? So, feel free to drop into the chat. I'll give you a moment. So, I see a lot of different things. Empowering education, responsive, preparing them for the future, challenging for the future. So, I see a lot of different things. Very good. So, there's some variation there, relationship and community driven, connected. I like that. A variety of skill sets. Very good. So, when I asked this question in my international talks, I get similar responses. And as you saw, even in our little small sample here. The future often comes up. This is 1 of the most common answers I've seen. And that's why I kind of predetermined here is one that prepares them for the future. And that sounds great. And I think it does encompass some of the other things that other folks brought up about empowerment and enrich positive, challenging experiences and so on.

And this sounds like a great goal. And as we kind of dig into this goal, and I spent the past probably 2 and a half years really trying to understand, well, what does that mean to prepare young people for the future? And I actually, there's a field of study called future studies. So I read a lot of the literature in there. And my own work in creativity studies is often very future oriented as well. And so when you dive into that literature, what you realize and what the folks in the future studies literature will tell us is, there is no future. The future is unmade. And even if there was a foreseeable future, it's not the future, but there's multiple possible futures. So it's kind of undetermined with multiple pathways. So that kind of makes it a little bit more challenging for us as educators to kind of understand. OK, well, if there are multiple futures, the future is unknowable, essentially, then how can we operate in the known present and design something that can prepare students to realize the possibilities of unmade futures.

What I call the educating for unknown futures paradox. And so I think this is something we want to think about is how have we resolve this? I mean, obviously this hasn't stopped education from moving forward. So we have resolved in a certain way. But I want us today to really expand our thinking and to really imagine how can we even go further? How can we be more ambitious in our goals? So that we really do account for multiple possible futures. And when we do that, it causes a lot of uncertainty and ambiguity. That's kind of a daunting question. And so I just want to illustrate when humans face ambiguity and uncertainty, we really don't like that experience and we tend to try to resolve it as quickly as possible. We might try to ignore it, but at some point, we might have to face it and say, OK, this is what I am... This is how I'm gonna think about this uncertainty. And so I'm gonna give you a little audio illusion here and you might have to really crank up your volume on your device, that you're viewing or listening in on and so we have before you 2 choices.

And we have green needle or brainstorm, so select 1 of those. It doesn't matter. And then listen to this sound, which again is going to be somewhat faint. So crank up your volume for this 1 example. And focus on green needle or brainstorm. OK, did you hear what you were focusing on? In that kind of faint.. audio sound, and you could put yes or no in that. OK, so I see some yeses in there. OK, now focus on the 1 you didn't focus on. So this is the same exact sound. I'm not swapping out the sound somehow and it wouldn't work anyway, because I don't know what you focused on. So focus on the opposite. And did you hear the opposite? So how is that possible? The same exact sound. Can be interpreted based on what you were focusing on. And in psychology, we call this cognitive priming. We tend to do this when we face something uncertain. We don't like it. We want to make meaning. And so we tend to go with our preconceived notions of the way it should be. And I think this is kind of a auditory metaphor, if you will, for how we think about the future when we're preparing young people, we have a sense of what that future is going to look like.

And that helps us confidently teach everything that we teach them, even when they say, do I need to learn this? When will I ever use this? I mean, I've had multiple conversations with my daughter, for example, around that. And sometimes I can say clearly, yes, you will need to learn how to read. But other things sometimes raise a little more questions like, when will I ever use algebra 2? When have you used algebra 2, dad? And I'm like, well, I'm using it right now to help you with your algebra 2. But that's not a very persuasive message. So I think we wanna be open to rethinking, not getting rid of what we do, but expanding what we do to prepare young people for broader futures. And one way to help us kind of think about this, again, drawing from the folks in future studies, is they like to develop these future cones to kind of illustrate their concepts. Their cones are much more elaborate. So, this is kind of a simplified version that I use in my new book, Uncertainty by Design. Shameless plug for the book, you don't have to buy it, but this is just where it's coming from.

So, the idea here is when we're in the kind of present and we're looking to the foreseeable future or the near future, it's a lower level of uncertainty. So, we can, with confidence, tell a primary student that when you get to secondary school, you're gonna need to know this because I know what the curriculum is. And when you graduate secondary school, if you're gonna go on to university, you're likely gonna need to know these things. Or if you're gonna go into the world of work, you're gonna probably need to know those things. And so, we often feel pretty confident in what we can share with young people about the foreseeable future. But as futurists remind us, as we move out beyond the foreseeable kind of immediate future, things get a little messy. There's a lot more uncertainty and there are things that happen. There's occurrences that happen, even if we feel like we have a very clear trajectory. So, you know, students might say, well, I wanna be an engineer when I graduate from university or I want to work in plumbing or whatever the case may be.

They might have a very clear plan. But then things happen in life that impact trajectories of not only us as individuals, but also the human experience. And so, some of these unexpected experiences are called wildcards. And wildcards are things that we are aware of, but the probability of them occurring is so low that we don't even really consider them until it happens. And we all experienced that with the pandemic. We all knew about pandemics, but we never really imagined it was gonna just happen when it did. And so that did and does change the trajectory for both individuals and globally. And then there's Black Swan events. These are things that we don't think are possible, like the namesake of Black Swans. At one point, folks thought there was no such thing as a Black Swan until they discovered, in fact, there are. And again, Black Swan events are things that we don't think are possible, but when it does happen, it really does change things like generative AI and all the conversations around   
it now.

We didn't think it was gonna advance this rapidly and we didn't think it's going to move towards a place where it can match human performance and perhaps even exceed it, in the near future. And that changes the way we need to think about how we prepare young people. Then there's unknown unknowns. These are things we can't even imagine. And when they happen, it again changes the trajectory of our lives, the way we educate young people and the future. And so what futurists invite us to do, which I think is a great exercise, is to develop some scenarios and try to imagine that. OK, so one scenario is the foreseeable future, which is what we kind of operate with in education. We have a scenario for how to prepare young people for the foreseeable future. But again, what futurists invite us to do is to think about, well, what if things change? Can we think about how can we prepare young people for the uncertainty of the change that is inevitably gonna be experienced in their lives? And so what would that look like?

So, can we develop a variety of different scenarios or models for the way in which we prepare young people for unknown futures? But let's stick with the likely futures right now. This is the most common model. And as I took a deep dive into this, I tried to kind of unpack the logic of what we do in this place called school to prepare young people for likely futures. And as you can see here, as we start with no known, so we start with what we already know in the bodies of knowledge that are already available and what we think students will need to know in the foreseeable future. And we specify learning objectives. And then we support student’s attainment of those objectives and we evaluate that and if they meet that, then we rinse and repeat and we identify another known known and continue on until we kind of exhaust the curriculum that we're trying to prepare young people for. And so this is a very logical, coherent, fficient model. It's nothing new to anyone. Maybe this diagram of it is, but this is the way in which we actually teach.

And it's so pervasive that even the way we talk in this place called school. So like teacherly talk, you can see this logic kind of baked in. So I want to show you how ingrained this is. So, in the seventies researchers observe teachers, and they looked at the patterns of classroom talk, and they identified these 3 elements that kind of fit really nicely with that kind of preparing for likely futures, the known knowns. And so the 1st piece of this is the teacher, and it's usually teacher will initiate a known answer question. So, after, maybe given a mini lecture or demonstration, the teacher will ask a known answer question. Then the student has a chance to respond and what the student is trying to do is provide a response in an expected way to match what the teacher is looking for and the teacher will evaluate and say, yes, that's correct or no, we need to kind of revisit that. And so this is the pattern of school talk, and you can even see it in young children when they're playing school, they use this pattern when they assume the role of the teacher.

So, this is a little image of my daughter when she was in kindergarten. And she's sitting with her dog, her dolls. This was like the 2nd, week of kindergarten. And she's reading a book to them, and she asked 1 of the dolls there, Jonathan, what's this book about? And, you know, let's and Jonathan, and she mimics Jonathan's voice. It's about trains and she's like, no, Jonathan, it's not about trains Lucy. What's this book about? And it's about a little girl who goes on an adventure. Good job Lucy. Right? So that is the IRE pattern. It's not a problematic pattern per se, it's kind of a default pattern because it matches the logic, but as we will talk about, it can seal off opportunities for student creativity and also to. The kind of creativity that can benefit the learning of other students and even teachers themselves. So, let's take a closer look at that from an actual classroom example. This is IRE in action and this the 1st, 2 parts of this are modified from an excerpt from an actual classroom lesson that we're going to actually watch a little excerpt   
from later.

And then I added this 3rd piece down here. So the teacher is starting the class. This is a 3rd grade mathematics class and the teacher says, before we start a lesson of odd and even numbers, any more comments about the meeting? I'd like to hear from as many people as possible, what comments you had a reactions you had to being in that meeting with the 4th graders yesterday. So they had a meeting about they're learning about odd and even numbers. They talked to 4th graders about them and Sean raises his hand and Sean says, "I don't have anything about the meeting yesterday, but I was thinking about 6. I was thinking it could be an odd. It could be an odd number." And before he's able to finish the teacher says, let's be careful here Sean, a number can't be both odd and even 6 is an even number. Can someone help Sean out? So this is a reasonable teacher response. She doesn't want to cause confusion, but at the same time, this is what I call killing ideas softly, because we don't know at this moment whether Sean is confused.

If Sean has something creative to say, because Sean kind of got cut off, or if Sean's trying to disrupt the class, those are 3 possibilities and I would say in any of those cases, it's still worth exploring this further rather than just immediately evaluating. That's where this IRE pattern breaks down. That's where preparing young people for likely futures where we just stick to the known-knowns breaks down when it comes to generative ideas, helping students navigate uncertainty and helping ourselves support that uncertainty and explore. There might be something Sean has here. That's more generative than we're seeing on the surface. Makes sense? OK, so...

SPEAKER:  
OK, so before we start our lesson of odd.

RONALD A BEGHETTO:  
So, let's move from what is to what could be so that's what is that should be very familiar with you all. We've all experienced that as young people ourselves in this place called school and we kind of tend to use that model. I know not everyone in this webinar does always use that, but it's a very prevalent model of teaching. So what is the what's another scenario? What's another alternative? So, this is 1 that I propose in my book. This is kind of the focus of my book. I say, you know, we can still use preparing young people for likely futures, but we should at least intentionally build in some learning opportunities that prepare young people for possible futures. And in order to do that, we have to inject intentionally some uncertainty into the space. So the way we start here is with known-unknowns. So, we might invite students to identify a problem in their school or community that they don't know how to solve. And then we, as adults don't even know how to solve or it could be something they want to build.

Maybe they want to build an AI bot or a robot, or they want to create a new game or whatever the case may be. We don't know exactly how that's gonna turn out. And so, in that case, there is genuine uncertainty here. And then what we do is we support them to engage with that uncertainty in a kind of a structured way. And then help them imagine in that new possibilities, some of which might actually resolve that uncertainty. They might actually create a solution to a problem they've been facing in school or a problem that's in their community or something they want to contribute to their community. And so it's through this kind of design and we'll dig into this a little bit further, that we really can help support and create space for creative expression that can be generative and make a positive contribution. So, how does this promote student agency and creativity? So, I'll just give you a quick definition of how we define my colleagues and I define creative agency. This is really intentional and self-directed capacity that all humans have to envision and enact new and meaningful actions.

So, this is when we are facing genuine uncertainty and our routine ways of thinking and acting no longer work for us. And so, instead of force fitting something on there, like just say, no, I definitely heard brainstorm. I didn't hear green needle. We realize, OK, this is an ambiguous situation. I need to think and act in different ways. And that's when we need to be creative. We don't always need to be creative. We need to be creative when it's unclear what to do next or for creating something new. So, this is constrained by the context. So, this could be academic learning standards. So, that's the other thing about creativity. Some people think creativity just unbridled originality, but creativity always operates in constraints. So, that's an important, I think, and a nice thing to hear as educators that we don't have to throw out our standards or objectives, but we can allow students to meet those objectives in new and different ways that maybe we didn't even imagine. And when we do that, it can bring about change in our lives and the world around us.

So, that allows young people to exercise their creative agency to see that they can be the creative authors of their own learning and lives and beyond that to make a contribution to others. So, how does that look? And we'll talk about in a moment and you'll get to play around with this with AI as well...

RON:  
How does that look in the typical classroom? And so I would say there's 3 levels of uncertainty that can support agency and creativity if we allow it into the classroom. So, the 1st is at the micro moment level and this is kind of what we've already talked about. During classroom talk where a student shares an unexpected idea, rather than, you know, gently dismiss it or redirect it exploring that can be a generative moment. Then in our planned activities, when we design our lessons, we tend to have everything planned down to the minute sometimes. And what I would invite us to think about is what if we injected some to be determined elements where we didn't know where it was gonna go. Doing that creates an opening that can lead to creative outcomes and can support students own sense of creative agency, and then we can also design these larger scale or broader projects that can go on for a week, or the entire school year outside of the classroom where students really identify problems or things that they want to create and we support that them in the endeavor.

So, let's dig into the 3 of these. We'll start with micro moments. So, micro moments are these openings that happen between teachers and students. They can happen between administrators and teachers between our colleagues. And they may appear insignificant, but they can have a substantial impact on our creative potential in our students, creative potential. And I really do believe these are defining moments. So we can have a lot of slogans in our classrooms, for example, that says, be creative. All ideas are welcome. Until some students says something that's really unexpected and we kind of step back from that and that's when the student says, well, I thought all ideas were welcome or I thought you wanted me to be created. And so what we tend to do, and I put myself in this as well as we often dismiss or quickly redirect students when those unexpected ideas occur, because we have a plan lesson and we're trying to get to the next thing. And sometimes this happens, because, you know, maybe a new teacher lacks confidence in the subject matter or knowledge, or they feel uncomfortable with curricular uncertainty.

They think it's going to drift into curricular chaos, which it can, but we can trust ourselves and our students that we won't let that happen. Or we might perceive unexpected ideas as distractions. So, while it's true that not all unexpected ideas are creative, they do signify the potential and therefore should be explored rather than dismissed. If we continually dismiss students ideas, then they get the message that, you know, new ideas, different ideas, different than what we expect are not welcome here. And this is where really creativity does require difference right? It's, not just a benefit, right? So students who have a very different social, cultural, historical perspective are often going to say things that might we might perceive in unexpected ways, but can be very generative and can be accurate, but we really need to be able to sit with that and explore that. Does that make sense? Alright, so if you have any questions or comments, please put them in the chat. I'm keeping an eye there.

So let's return to this micro moment. Where the teacher asks before we start working on on even numbers. And then Sean says, I was thinking about the number 6, which I think is a pretty fantastic thing to hear somebody say, you know, 3rd grade, I was thinking about the number 6, but then this is an unusual thing that it can both be odd and even. That's a micro moment. So how would you respond to Sean in that moment? Does anybody want to share a couple possible thoughts? And you can put an ideal response or an actual response or response that, you know, you might see as typical. And I think this is one of those cases where when we hear this, we really want to get on to the lesson we planned. And this seems like a potential distraction that can cause confusion. So, it does seem justified to dismiss, so ask him to share his thinking. That's a very simple move. So, yes, evaluate or explore first before evaluating. And you can continue to drop that in there, but I'll show you how generative AI can help in this situation, and then we'll go to that actual classroom and see how the teacher in that classroom navigated in what I think in a beautiful way that response for that student.

So I've developed this tool called the generative... It's based on generative AI. It's powered by generative AI in the back end, but it's really focused on doing micro moment analysis. So you can access this spot and use it for free. You can either use this QR code, or you can go to this URL. So you can play along if you'd like, or you could just screenshot it and try it later. But this is what you can do is you can put any transcript in here. You can just come up with any transcript something. Maybe you've seen something you've said that you want to revisit how you might do that differently. And then you just click on analyze after you put that transcript in there. And in this case, I put Sean. That's incorrect. So it's just a redirect. And what this bot will do is it'll identify all the micro moments in that transcript, the openings, and it'll explain why it thinks it's an opening. So, Sean's gonna respect the response as an opportunity to explore and develop his idea. And it gives you even a suggested response.

Well, Sean, that's interesting. You're thinking about six to be composed of different numbers. Can you explain more just like we heard? And then it gives you an alternative transcript of how this lesson might unfold if you were able to respond differently. And by doing that, you can kind of go back and forth and try different possibilities. And it can even you can ask a follow up questions. Like, how is this an example of creative and academic learning? Don't we want to ensure students can learn the correct definition of odd and even numbers? And you could say yes, but we also want to support creativity here. And we can, of course, make sure that they are clear on the definition of odd and even numbers. So this bot is really meant it's based on my research on micro moments to really support teachers in imagining new possibilities and identifying micro moments, giving suggestions that they can try out, take it or leave it. These aren't prescriptions, see where that would go. So it actually gives you a different trajectory and then have a dialogue with it.

So you can really kind of learn from this. So you could put any kind of conversation in there and identify potential micro moments. That could be creative openings. So now let's look at this lesson next. And again, you might want to turn up your volume to where it's a good volume. This is the actual classroom. This. Comes from an excerpt from the University of Michigan again, a 3rd grade classroom. It starts out just the way we started, but now you'll see how this teacher actually responds and where Sean's idea leads to. So let's take a watch and listen. (VIDEO PLAYS)

SPEAKER:  
More comments about the meeting. I'd really like to hear from as many people as possible. What comments you had reactions you had to being in that meeting yesterday.

SEAN:  
I don't I don't have anything about the meeting yesterday, but I was just thinking about 6. So I'm thinking that it's a, it's an ad. It can be an ad number 2, because there can be two, two, four, six, two, three, two, that would make six. And two threes. It could be an odd or even odd number. Three things to make it, there could be two things to make it.

SPEAKER:  
And the two things that you put together to make it were odd, right? Three and three are each odd, right?

SEAN:  
And I think the other two were even.

SPEAKER:  
So you're kind of... I think, Nathan said that he wasn't talking about every even number, right? Nathan were you saying that? Some of the even numbers like six are made up of two odds like you just suggested? Other people's comments.

CASSANDRA:  
I disagree with Sean when he said that six can be an odd number. I think six can't be an odd number because look. Six can't be cause this is even, odd, even odd, even odd, even odd, even odd, even odd, even odd.

SEAN:  
Because...

CASSANDRA:  
Zero is not an odd number.

SEAN:  
Because there can be three of something to makes six, and three of something is like odd, like see, you can make two, four, six, three twos to make that, and two threes to make six.

KEITH:  
But that doesn't necessarily mean that six is odd.

STUDENTS:  
Yeah. Yeah.

SPEAKER:  
Why not?

KEITH:  
Because you need two odd numbers to add up to the even number doesn't mean it has to be odd.

SEAN:  
Three twos proved one, two, three, four, five, six.

TEMBE:  
Prove it to us. prove it to us.

SPEAKER:  
OK. Does everybody understand what he's trying to argue? He's saying six could be even or it could be odd. Well, watch what he's gonna prove and then ask the question about it.

SEAN:  
Because see this. There's two. Number two over here. Put that there. Put this here. There's two, two, and two. And that would make six.

CASSANDRA:  
I know which is even.

MEI:  
Oh, I think I know what he's saying.

TEMEB:  
What is even?

SPEAKER:  
Could you stay there people have some questions for you?

MEI:  
I think what he is saying is that it's almost, I think what he's saying is that you have three groups of two and three is an odd number, so six can be an odd number and an even number.

SPEAKER:  
Do other people agree with that?

STUDENT:  
No.

SPEAKER:  
Is that what you're saying?

SEAN:  
Yeah.

SPEAKER:  
Hey, do other people agree with him?

STUDENT:  
I disagree.

SPEAKER:  
Do you disagree with that? Yeah, I disagree with that because it's not according to like, here, can I show it out? It's not according to how many groups it is. Let's say that I have, let's see. If you call six an odd number, why don't you? Let's see. Let's say ten. One, two. And here are ten circles. And then you would split them, let's say, I want you to split them by two. One, two. One, two, three, four, five. Then why do you not call ten an odd number and an even number? Or why don't you call other numbers an odd number and an even number? I didn't think of that that way. Thank you for bringing it up. So, can I say ten can be an odd and an even? Yeah, but what about other numbers? Like, if you keep on going on like that and you say that other numbers aren't even, maybe we'll end it up with all numbers are odd and even. (VIDEO ENDS)

RON:  
OK, I'm gonna stop it there. So, I think a very interesting lesson. There's a couple of things I want to highlight. I see a question in there and I want to invite your comments and reflections on this as well. So, here we have this kind of unusual comment that six is an odd and even number. And again, our inclination might be, I don't want to go there. I'm gonna softly dismiss this and we're gonna move on. But that's not what this teacher did. And, you know, she kind of gradually invited other students in and they really dug into this, you know, we want students to like, prove it. And then, of course, Mei comes up here and is, you know, understands what he's saying, but then is trying to disprove it. And, you know, he's grateful that she identified ten. He's like, thank you. I disagree with myself. I think ten's also not an even number. And then she gets frustrated at the end. And this lesson, this goes on for a while, this lesson, and then even the teacher has a little log and thinks about, oh, my gosh, are we gonna go off into the deep waters here of confusion?

Should I step in? And they end up continuing to work with this idea. And what they identify is that not all the numbers share this property. Where they can be split into odd, it could be an even number that could be split into odd groups. And so they come to a kind of a class agreement that they probably shouldn't call those odd and even numbers, because that doesn't make sense given the definitions. But they'll just end up calling that class of numbers, Sean's numbers. So that's how they resolve that. And they actually went deep into mathematics. I mean, think about this. This is not a lot of tech. This is a stick of chalk and a chalkboard, and they have this very lively conversation about mathematics at a pretty deep level. And so, again, as was mentioned in one of the comments, if this was dismissed, we would never get to see this level of mathematical reasoning, which ultimately resolved into something generative that they called Sean's numbers that does represent properties of a certain set of numbers.

And so, I do see a question in here and I invite you to also put any comments in there that things you observed, anything that you want to kind of point out. But from Nick, we have the question of, you know, if we miss a moment like this in class and redirect away, which often happens, you know, is it worth going back and following the lesson up to kind of explore that? And so what I've seen some teachers do is they have on their chalkboard or whiteboard or digital board or whatever spaces they have in the room, they have something called an idea parking lot. And so what they might do in that moment is realize, I really don't have time to explore this because we really need to cover this for whatever reason. And so they will write that idea down on what they call the idea parking lot. So they might put Sean's idea of 6 is both odd and even, and that's a way to honor the student's idea and signal to them that we're coming back to this and then, of course, hold yourself accountable to actually come back to it.

So, you know, sometimes idea parking lots can turn into idea graveyards. We don't want that to happen. So I think we do want to always go back to that. So that's one way of handling that. But other thoughts, responses to this. What did you think about the way the teacher handled that? And it seemed, you know, there was even early in the video, there was students that seemed like they weren't even paying attention, but eventually it did. But you didn't see the teacher kind of jumping in and correcting or, you know, the teacher really did explore. So here we have Sam saying, you can imagine this was the discussion that created odd and even numbers in the first place. If that's possible. Yeah, this seems like a very kind of almost ancient conversation about principles of mathematics. It's a very deep conceptual conversation. And the teacher took themselves out of the center. Absolutely. So this is again, being willing to just sit with this uncertainty often means stepping out and not trying to quickly resolve it, which can be a little unsettling as a teacher.

Because we do kind of have to keep an eye out for curricular chaos, but being confident in yourselves and your students that you can bring it back. And I think it is really about trusting yourself to do that. So the students appear to know that they had a lot of agency and creatively way. Have a big discussion and also time. Yeah, time is a tricky item in my book where I talk about micro moments. I show because I always get the time piece. So I show another lesson that is like, let's say it's 24 lines of interaction between a teacher and a student. And then I used a bot to show that you could have take 24 lines and take it in a completely different creative generative space, rather than just continually try to drive the students to the correct answer within the same 24 lines, so it is possible to do this within the same time. Now, this was obviously a little bit more prolonged of a lesson, but I think again, if we just invite ourselves to, you know step aside, provide agency, let the students explain it themselves.

And I think this is a much richer and deeper conversation that I think will have a lasting impression on all because they really did dig into these ideas. So, the concept by James Nottingham, the Learning Pit where you can make this make the time, like the car park where you can discuss these topics interaction. That's very good. That's the other thing you can, you can section off a portion of time. I think this shows that we can create a lifelong love of our subject, genuine engagement showing courage on the part of the teacher. Absolutely. She didn't know where this would go. And this is what educating for possible futures looks like. It isn't a genuine uncertainty unless you as the teacher don't know where it's gonna go or how it's going to get resolved. So to be determined. It was our classroom look, not my classroom. Absolutely a very shared space where students felt empowered to jump up and ask for the chalk or go and point at the number line. Well, established protocols about respecting different people's arguments.

Yep. So there were no personal attacks, even though they were passionately disagreeing a lot of engagement in that micro moment. And then how can we reward this type of thinking and communication collaboration? There are no exams that test whether students can do this. Yeah. So I think the kind of outcome metric of this kind of work are artifacts like this, like this. This conversation and then when we talk about larger scale projects, you know, when students create something that wasn't in the world before they solve a problem that everyone has known as a problem the community for years. For example, you know, maybe it's a broken down playground or something like that. Then they can just point to it and say, this is what it looked like before. This is what it looks like now. This wasn't here before now look what we created and I think that is the kind of metric that we kind of judge that by and it has its own intrinsic rewards and or engagement. Yep, it wasn't just the teacher giving this up space learners respected each other.

And open ended. Yes, very good. Bring back the known-known. Or we keep discussing and going so, yeah, I think again, taking a both and approach so I think that's what they ultimately ended up doing. They went back to the known known of odd and even numbers going back to the definitions and saying we can't call these numbers that because we already have a set of definitions, mathematical properties, but this is something else. That's why they called it Sean's number. So they have the both and they have the known-known. These aren't odd and even numbers, but there are Sean's numbers that have these particular properties. Yep. The developing in regard the testing exam aren't quantifiable, but at least the students taking bigger chances and learn as they grow, and that's kind of my main argument here is we want to do both and we want to give them the knowledge that we think they'll need or confident they'll need, in the foreseeable future, but we also want to equip them to have this kind of agency to navigate uncertainty and try to resolve it in a positive way.

So, thank you for that very generative discussion. So, that's the micro moment that is the micro moment. Now let's talk about planned lessons and this is where it can get. To the place where we really engineer away opportunities for creative agency and expression and I think a lot of this were taught and I think we teach this to our teacher preparation students to plan lessons to over plan lessons. And I think we carry this out in our lives. We over plan our holidays, we over plan our relaxation time to the point where we try to engineer away any uncertainties, but there's a great curriculum theorist ideas names, Ted Aoki, he's passed on. He was a Canadian curriculum theorist, and he talked about this idea that, you know, when the lesson that's planned meets the lesson as lived, there are always gonna be these ruptures or gaps. It's never going to go the way we planned, even if we try to plan it down to the last moment and that those little ruptures can be very generative. And so that fits in with this idea of creative openings.

And so I think what we wanna.... When we talk about planning a lesson, or maybe you're planning a staff meeting, if you're administrator, or you have an agenda to think about the agenda as plan versus the agenda as live, there's always gonna be unexpected moments, micro moments. Can we bake into our lessons and plans, whatever we're planning, some to be determined element so that not everything is predetermined by the teacher. And I think that is a way to signal to students that we do trust you and we do want you to develop your own creative ideas because we don't even know how this is gonna turn out. It doesn't mean throwing away structure, it's structured uncertainty. So, I call this lesson unplanning. And I invite educators, particularly if they have a lesson that they don't like to teach. So, if you have a lesson that you don't like to teach or students don't like to learn it, that's a prime candidate for lesson unplanning. And so the idea here is to intentionally modify some of the predetermined elements.

So, look at all the predetermined elements that you've planned out. And then take 1 or 2 of them and turn them into to be determined elements. So that you introduce kind of a non-routine problem. You introduce some uncertainty in there that still meets the criteria. So, you can have the criteria fixed. But the way they meet the criteria could be different than what you've traditionally done, right? So, we'll talk about what that looks like. But it starts by taking an over-planned lesson and starting to unplan it to allow for to be determined elements to be present so that students can actually engage in that, and we don't know how they're going to actually resolve it ourselves, and neither do they. And that's where they actually start developing creative confidence and creative agency. So this is kind of a, looks like some a messy heuristic here. But the idea here is pretty simple. I try to take any kind of planned lesson or activity and say, there really are basically four elements. We have a goal or an objective, what we want students to do.

We have a process, how we want them to do it. And these are usually known knowns, right? Predetermined. And then we have a known outcome, what we want to see at the end. And then we have criteria for success which could include you need to work alone. You have to memorize this or you can you can use your book or whatever the case may be. Those are the four elements the what, the how, the product, and then the criteria. And again, those are usually predetermined. So, what I'm inviting us to think about is can you take a lesson and maybe change the objective? The what? And say, here's one way you could do this, but what other ways could you use this process we've taught you? Or here's what we want you to do. Here's one way to do it. But can you come up with your own way? Or here's what we want you to do, how we want you to do it, but what you show us to demonstrate your knowledge can be a variety of different things. So many of you probably already do this, but as you start thinking about this in a more systematic way, you can realize that you can start unplanning more elements to the point where you're providing the structure and you're providing some examples, but you're really encouraging students to find their own way through the path to both learn and have a creative outcome.

So, that's what lesson unplanning is about. I have an example of a lesson that's over planned, and then we will move into another example of a bot that you can access and try out for lesson unplanning. So, in this lesson, this is let's say it's a grade five lesson. Students are going to learn the basic water cycle. That has these different elements. So this is sort of like a state standard or something. And then the process is they're going to listen to a very detailed explanation of the water cycle. They're going to watch an educational video that illustrates it, and then they're going to participate in a class discussion to reinforce their understanding. And the outcome is they're going to be able to accurately identify each stage of the water cycle on like a worksheet or something. So, the criteria for success will be they'll successfully complete the worksheet, be able to label the stages in the diagram, and answer a series of questions to test their understanding. Very standard, no known lesson.

So, any ideas for how you might unplan this lesson? So, you can unplan any of these elements? The objective, the process, the outcome, the criteria for success. It's good to have maintained some predetermined criteria for success so that students know what they're being evaluated on. But any ideas? Drop in the chat, an idea for how you might unplan this particular lesson, and it can be brief. OK, so I see some ideas here. Form groups and develop their own explanations of the graphic on the screen. So again, yeah, that's a way to unplan it. But rather than just having individual students, they could do that collectively. So, that's part of the outcome or process. So, you can kind of think about that. Of course, you could give them just the objective or just the outcome and get them to come up with the rest themselves. Absolutely. So, yes. You're starting to warm up here. See if they can work out the water cycle in groups before any teaching. Just give them the picture and have them. Yes.

Interpret that. That's great. Looking at prior knowledge before starting brainstorming ideas. Very good. Take the labeling off and see if they can complete it. Pose a question that explains water cycle. Yeah, these are good. So yes this is you're starting to kind of warm up to this idea. Thank you for sharing those. So, I have a bot that I kind of trained on my concept of lesson unplanning. And you can access that bot with the URL that's up there. Or you can use this QR code and you can access this by free. I think you just have to sign in because this is hosted on OpenAI's website. And I'm going to put that lesson we just saw into this bot so you can see how it works. So, these bots, the way I design these is they are very question based feedback. They don't tell you what to do. So, the first thing it's going to do is give you a summary table. So, it's going to put it in the format that we just talked about. So, I've kind of trained it to do that. It's going to ask is that correct. Do you want to add or modify anything that looks good.

So then it's going to give you some possibilities. So, what about a student-determined objective? Students could choose one stage of the water cycle for research. Or students can identify real-world applications of the water cycle. And then it gives you various student-determined processes, different products, different determined criteria for success. So, I'm going to pause it right here. So you can kind of see this. So you can have these different unplanned strategies. So students can decide what aspect of the water cycle they could determine the process. They can decide on how to demonstrate it. And they can also help define the criteria for success, particularly if they're changing the outcomes and process. I think that's a good place to involve them. It explains how this could support creative learning and how you can teach with creativity as well. And so it then will ask you, do you want to explore this any further? And that's the nice thing about these bots is you can be in dialogue with them.

You can just be in constant conversation. You can say, no, that will never work for my students because of X, Y, and Z. Or can you give me an image of what a water cycle skit would look like? Or can you tell me more about the water cycle skit? So, early on the bot said they could do a skit as one of the ways of demonstrating their knowledge. So, here's an example. It says, okay, this is what the water cycle skit could look like. You could have them plan a little skit. It gives you some ways of thinking through this, of planning this activity. It helps you think through the criteria for success. It gives you some example skit outlines. And again these bots are meant to give you answers. They're dialogic. These are just possibilities. Again, it gives you more ideas about that. And then I say, okay, can you give me an example of what that might look like? And it will actually give you images if you can't visualize what this is describing, so can you give me an example of what scene three might look like of the water cycle.

And so these bots are very powerful because they're multimodal. You can use audio. It can generate images like this. It can help you really start thinking through again. If we go back to that futures cone, different trajectories of where these lessons can go. You have this one lesson. Here's another way you could take it, and you can come back here and take it in a completely different direction. And that's where you can start generating ideas of how you can open up your lessons, but still be in charge and still maintain your agency over them. So, you'll see it always has these questions to say, really, these are your ideas. Does this make sense? Do you want to change anything? Do you want to go back. You can always go back and rediscuss any of these things or make modifications. So, this is a way in which generative AI can work within this kind of concept of lesson unplanning. Any thoughts, concepts about this, and feel free again to try it. You can give it a shot, put an idea in there, or just have a chat with that bot and see what you think.

So, let's see what folks are saying here. Yep. So, thank you very much Anam for putting the hyperlink in there so you could try it out. You can click on that bot. Again. You might need to sign in if you don't have a free OpenAI account. It's a free account, and you can try that bot out. So, the idea here again is we're moving from the micro to now the kind of lesson, the daily, the molar. And then we're going to move to the macro where we think about longer-duration projects that can really impact student creativity and agency. And that is what I call legacy projects. This is kind of like project-based learning. But the difference here is it really is meant to have a lasting legacy. So it's unlike service learning or something where students might go into a community and then disappear. They really have to think about sustainability. So, if you're in secondary and you're heading off to the world of work or university, who's going to continue the project when you leave, can you bring in if you're a grade 12, can you bring in grade ten and grade 11 folks to kind of continue the project?

So, really thinking about let's not just create something and walk away from it, how do we make it sustainable and make sure it's making an impact. So, this is a four question basically curriculum or project planning curriculum. And you have the legacy project planning canvas that I shared. And if you don't have a copy, you can ask for another one. That kind of gives you the planning form that you need. And I developed this working when I was at the University of Connecticut. I was the director of innovation House there, and it was for first and second year university students of all majors. And this was the curriculum. We spent an entire year with these four questions. I said, I want you to identify a problem that's relevant to you, that maybe some people don't even think is a problem that you want to solve, and then you have to build a case for why does it matter, who is this problem impacting? How do you know? What will happen if you don't do anything. So build a rationale and then start pitching that problem to other people.

See if you can get some partners. So you might not have the expertise to solve the problem you want. So who could you contact? Is there somebody in your school if we're working in K-12, is there somebody you can contact through the internet, through zoom, an outside expert, or is there somebody in your community that has experience or expertise that can really help you out in coming up with a plan of how you're going to address the problem. And then how are you going to before you start? How are you going to think about the sustainability of this? How are you going to monitor progress? How are you going to make sure the work continues on and is actually having a positive impact, rather than an maybe an unintended negative impact? And so again, we spent an entire year using these four questions as our entire curriculum. And what I learned by year two is we need to spend the first 15 weeks on this first question, what is the problem? Because a lot of students weren't able to differentiate between a problem and a solution.

And the unsurprising but kind of sad thing was here were these really kind of accomplished students that were at university. This was a selective program, and the vast majority of them had never, in their entire education career been asked to identify a problem themselves. They said I've always been solving other people's problems or problems that have already been solved. I've never been asked to solve a problem. They didn't believe us. They said, what should we solve? We said, this is an opportunity for you to do that. And so they would say things like, well, I want to build an app, but what problem does the app solve? So we had to spend in the second year, we realized we could get better projects if they really spent a year in problem finding and identification, because what they thought was a problem maybe wasn't a problem. And that's where some of these other tools that I'll show you can help out with this. So, this is a longer duration thing. And you might, again time looms large.

But what I invite educators to do, working in K-12, is is there five minutes a day or five minutes a week that you could devote to this? Just break away five minutes and just have them think about a problem for just five minutes at the end of class. Or it could be an after school program, but I think it would be great if you did this in a subject matter class, for example, and then just start doing that process in five minutes, over 180 days accumulates to something, right? They start developing something. Or this could be a club or whatever. But I think this is a really great way of doing it because you'll be amazed at what students can do. So some of the students in that I've seen do this, they've created new things in their schools that are show pieces. They have they put them in their portfolios. They've solved real world problems in their communities. They've created new clubs. Some students have created businesses out of these kinds of models. So it's doable. It's just about kind of persistently supporting students through this process.

And I've given you some tools that can help with that. So here's the planning canvas. So, it has a few more elements here. But this is what we kept it as. Just a one page document. So when they go talk to other people in the community or need help, they can just show them their thinking based on this canvas. And who's going to help them out? What materials do we need, how are we going to monitor progress and so on. But I've also built all of this into a bot. So again, you can try out this bot like legacy project bot. And the URL again is through that QR code. Yes it does look good I there. It is very comparable to the lean canvas for a startup, right? That's where I kind of got the idea. So, it is a canvas that a lot of startup companies actually use when they're pitching their ideas. So, this bot here has again been trained on this. It knows the canvas, it knows the questions. And it's really here to support people in developing a project. So I encourage you to try this out. And one way to try legacy projects is maybe you lead the first legacy project based on your subject area, and then you invite students maybe to come up with their own.

And so there's a hyperlink for the lean canvas in there as well. Thank you for sharing that. So let's take a look at this. So imagine we have a group of high school seniors who want to address the problem of social isolation in middle school because they experienced that themselves when they were middle school students. So, let's look at how Legacy Project bot works. And this bot, like all the bots that I develop, are going to always ask for a little bit more context. So here a summary of what you said. And it's going to ask do you want to provide any more details. Does this look good to you. And so it gives a chance to check understanding there. And then it says looks good. We're thinking we should start with sixth grade students. So providing a little bit more context. The more context you provide the better. So it says okay let's start exploring the problem. Let's understand the problem, the impact of the problem, current interventions and reflect on the problem. So, we'll stop it here for a second.

So it's going to start with the problem and really start unpacking it. You'll see it's not telling anyone what to do. It's just posing question based feedback. So, it's kind of almost obnoxiously socratic, what are the immediate long term effects of social isolation? Are there any existing programs or initiatives. So it does also encourage students to kind of go look beyond their own thinking to do some research. Are there deeper underlying issues? So, it really is a way for them to reflect and kind of deepen their understanding of the problem. And again, this is one of the most important thing about any problem or project based project is that you really want to spend time in problem identification. So, we might just say these are good questions. We'll think about them. One thing we know from our experience in sixth grade is they don't have-- If students don't have an existing friend group, they might feel disconnected. And it gets worse across middle school. And so then the bot will respond to that and it's going to take them to the next step.

Why does the problem matter? Again, a host of questions for them to think about impact on students broader implications. Need for interventions. Next steps. So developing a statement of purpose. Can you draft a brief statement on why addressing this sixth grade matters, and how could you communicate that to others? So this is like the project pitch. It helps them think through that. And you can stop it anywhere here and say, can you help me think, here's what we're thinking. Can you help me come up with a better, more persuasive pitch? And again, you don't have to follow this linearly. You can go back just like you're having a dialogue with a possibility thinking partner. And then it gets into what are you going to do about it. And it continues working them through the process. So, these students might say, one idea we have is to develop a video that can maybe be shown at the beginning of the school year about the problem of social isolation. So you can imagine high school students thinking, you know, we're just going to make this video to increase awareness, and then we're done.

But the bot will say, you know, it's always very friendly. That's a that's a good idea. But how can we kind of develop that? What message do you want? What should be the structure? How are you going to make sure it's engaging. And then how are you going to implement this. Can you have any follow up activities that go along with this. And how are you going to start developing this video. So again a lot to think about. And so the students continue on. You know we'll think about who might help us. And so here it gives examples. Here's some people that can help you know external experts school counselors parents and community members. And then make sure you have comprehensive planning. How about student engagement. Do you have any interactive elements just rather than watching a video, what can the students in sixth grade be doing? How can you promote it? How can it be sustainable? And again, it gives you a lot to think about. And they might you just maybe pick one. We like the idea of a follow up activity.

We're thinking about maybe presenting in groups, so it gives a bunch of ideas. Well, you could come up with maybe a buddy system or a mentorship program or social skills workshops. A lot of just possibilities. This is all just about possibilities. That's in alignment with that kind of educating for possible futures. It gives a lot to think about leadership activities. Would you like help drafting a plan? And you can say, this is a lot to think about. Here's the plan. It will actually give you a finished planning canvas. Well, it's not completely finished, but a starting planning canvas. So it summarizes everything they've discussed so far. Based on that planning canvas. It can also be downloaded into a word document that can be uploaded later shared out with the group. And so my model of teaching with these kinds of tools is to start with a human team first, have students or teachers working together, then go to the bot, get some ideas, bring it back to the team, go back to the bot. So it's humans are always centered and from start to finish.

And so these tools, I think, can be really powerful in supporting planning and most importantly, ensuring that students maintain agency over their own ideas. OK. How easy hard is it to build? Oh, so you can build, I think right now with OpenAI and a lot of different tools out there are low or no code at all, so you don't have to know how to code. When I first started building these bots, I did have to learn how to code, which the bots taught me how to do. The large language models. But now you could use GPT builder, which is part of OpenAI's GPT builder, and you can put in there your ID if you have a structure already. Like I already had these ideas like this planning canvas or lesson on planning or micro moments. And you kind of teach that to the bot, but you also teach it how to respond. So you put in rules like we will only talk about legacy projects if they ask something that's beyond the scope. Focus them back on legacy projects. Don't give answers, only give you question based feedback.

Try to push their creativity. Give them summary tables. So, you can set all those different rules. As far as security. So I think because a lot of these tools, there are open source models that can be local and locked down on your own school servers that are completely private. But most of those, like we have that at Arizona State University, and I use these tools in my class. So, those are very secure. These have security, but you're sending information to a company. They do have security protocols for enterprise. But again I would say don't put any sensitive information in here or personally identifiable information in these tools because it's being sent out to a company, unless you set up some sort of secure enterprise agreement with those companies. But I think for the purpose of generating ideas, it can be very powerful as long as you don't put any sensitive information in there. And yes, and you can refer to the Victorian state government guidelines on that as well. OK. All right, so let's talk a little bit about this responsible use of generative AI and how I think I've tried to demonstrate how it could be a partner possibility thing.

And then we're going to really open it up for questions, comments, concerns, anything else you want to discuss. So I thought, okay, instead of me coming up with a reason why generative AI would be a good partner and possibly thinking, I asked-- Google Gemini, which is another kind of available model that's free that you can use. There's so many models out there. Google has one, Gemini. Meta has one, Llama. Those are free. OpenAI. There's Claude Anthropic. Those are good models. If I just ask Google Gemini how would generative AI be a good partner and possibility thinking for educators? And here's what it says.

SPEAKER:  
(AUDIO PLAYS) Generative AI, with its ability to synthesise vast amounts of information and explore countless combinations of ideas, can help us envision possibilities. Beyond the limitations of individuals or collective human imagination by generating novel scenarios, innovative solutions, and alternative perspectives, AI acts as a powerful catalyst for pushing the boundaries of possibility thinking and exploring uncharted territories. (AUDIO ENDS)

RON:  
And I generally agree with this. I think one of the powerful things about this is it's dialogic. It's not search engine, it really is a partner in thinking. And the nice thing about it is... Right now it's midnight here and I've been up beyond midnight chatting with bots and generating ideas. And they don't get tired, they don't roll their eyes. And you can constantly push back and say, that won't work. Give me another possibility. Tell me more about this. No, that won't work. Give me five more examples. So, I think that's where it becomes very generative and it helps you maintain your own agency. And then as we teach young people to use these, the temptation for them gonna be to use these to do the work for them. And we wanna make sure that we set these up or set up the parameters either teach students how to use these in responsible ways - we should do that - and use structured prompts that won't allow the bots just to give them answers. That we really want young people to use these as just one perspective.

It'd be like talking to another group of folks in their classroom or outside the school. And that's just one perspective, but still maintaining their own ideas through the concepts. And so, when people ask, well, is generative AI creative? And how are our students gonna use this? I think that's the wrong question for education. I think having generative AI be creative for us is where we lose our agency. And I think that's a real danger. And so, the way to think about it, and I think the way we could talk about this with young people is how can we be creative with generative AI to augment what we're doing but still maintain ownership? And that's something I'm doing with the classes I'm teaching. I infuse some of these bots in there, and we're actually doing some research studies to see do students actually feel ownership over their ideas, and do they actually put their own unique twist on them, or are they just taking and copying and pasting from these bots some of the suggestions. So, that's what we're studying to see is this impacting agency in a positive or negative way?

And I think that's something we wanna look out for as we use these tools. So, this is just a couple principles about how we can use generative AI responsibly in education. I think the first thing is we really need to continue developing our understanding and become generative AI explorers ourselves. So, that's why I encourage you to try the tools out, try the tools I've built, but then yes, build your own tools. Try exploring your own prompts. So, thinking about these as thought partners to receive feedback, not just as answer machines. I think we need to get away from thinking them as answer machines. And when we do that, because we know that these tools can sometimes have biases or they can provide inaccurate information, although they are getting better, it's better if we think about them as possibilities. So, it's just a possibility and then we can kind of evaluate and say that doesn't make sense, we can always teach students to check their sources. And that's where this critical thinking component comes in.

We always have to evaluate the output, just like we would any source we find on the internet or even talking to a peer or colleague or whatever. We always wanna kind of fact-check. So, there can be inaccuracies and biases. Have a clear why. So, I think part of it is do you even need to use generative AI for what you're doing? Or can you just use a stick of chalk and a chalkboard? I think many times you can. But often when you're really facing uncertainty or you wanna try something new, that can be really powerful because they can even assume personas, like, how might a student who's really disengaged respond to this lesson we just talked about? Or how might a parent who really doesn't like what's happening in this class have a disagreement? So, you can anticipate different perspectives of different people and anticipate how to proactively address those in kind of a generative way. And so, when to use it, when you have clear boundaries and expand on ideas. And then again, teach students to use structured prompts.

And you can learn how to do prompt engineering where you write prompts. In any of these tools, you can go into the system prompt setting and you can say, don't provide answers, provide questions, follow these guidelines. And that's a way to use those freely available tools already and structured a little bit rather than simply using it for answers. And then I think the other thing we really need to teach young people and do ourselves is emphasise citing when you use a tool. Just like we teach students if they use a site of source or they use Wikipedia or whatever that they cite it. So, the way to cite that, just like I showed you in that earlier slide - Google Gemini AI was used for this, used in collaboration with me on this date. And if there are direct quotes, put direct quotes around it. If you're actually copying and pasting something bot-generated, put it in quotation marks. If it's paraphrased, paraphrase it. So, I think acknowledging that what you use and how you use it is really important.

And a lot of publishing companies, like some of the book publishers and journals I write for, they often have a statement now where you have to explain, did you use generative AI? What did you use it for and what capacity? And do you take ownership of the ideas? 'Cause they always say generative AI is not an author, you're the author. So, whatever you put in here, you're responsible for. So, I think these are things we can teach young people so that they can just realise they can use these tools, they just have to be transparent in how they use them, where their ideas are and what ideas they were used in conjunction, or what ideas that they are actually using directly from these tools. So, I see there are some questions in here. So, many teachers think of AI as a way for kids to cheat or be lazy. Yes, I think this is a way to really kind of shift that narrative, is to turn that around and say, yes, it can be used for that, but it can also be used as a way to be generative and to really empower young people.

I didn't know how to program or create any of these bots. I went to a chatbot, I think it was GPT 3.5 back then, or 3.0 maybe even, and I just said, I wanna build a chatbot based on this protocol I have and I don't know how to code it, and it just walked me through. If you have a Mac, download this... Step by step. A Saturday afternoon, I was able to build my first bot that was based on my protocol. But now you don't even need to do that. If you do wanna learn how to code, it will accelerate that process. But they have these no-code solutions now where anyone can really build a custom bot. So, just revisiting this, we've moved from what is. Not getting rid of what is but expanding it to also what could be going from no knowns to possible futures. Known unknowns and how doing so can support creative agency for us and most importantly for our students. And then how we can use these tools to really augment and accelerate, I think what we're capable of doing collectively and individually in the classroom if we do it responsibly.

And so, I think that ties in nicely with what we've been talking about for educating for likely futures. And by the way, this was generated with Midjourney, this little image here. Students walking into possible futures. So, let's open it up now for questions comments thoughts concerns.

ANAM JAVED:  
Ron, there's a great one from Brendan Jackson in the chat.

RON:  
Can you share that with me?

ANAM JAVED:  
Yeah, absolutely. So, Brendan said, "Firstly, such a thought-provoking session. Thank you. Wondering if you have any insights you can share about how legacy projects have worked in both single disciplines and in a cross-disciplinary manner. So, across the humanities, science, the arts. And do you have a recommendation of what might work better should we keep it focused on just maths, or is there a potential to open it up into interdisciplinary learning?"

RON:  
I think the most powerful ultimately becomes interdisciplinary, and the evidence for that is when I used that for Innovation House, starting with older students. But I've also seen this in K-12 and even primary settings. Because what ends up happening is students start making connections across the curriculum. And what happened at the university level is students changed their majors because of some of these projects. It was wild to see because they were working with students from other majors, there were students that were undecided and some students changed their majors when they saw they were just exposed to a new disciplinary knowledge. So, I think that is really powerful. However, I would say if you haven't done a legacy project yet and you're kind of maybe at the micro-moment openings or the lesson planning stage, then it might be, I think, more comfortable to build your own kind of creative confidence using these and stepping into the uncertainty of it in the discipline that you know the best.

And so, what you can do is you could do a legacy project in mathematics or science, and a lot of teachers that's how they start. And so, a common one is to have students maybe identify something they struggled with in maths, for example, and create some kind of learning support tool that they could give to the next year's class or the next semester's class that comes in. So, that's kind of a small scale, It's kind of constrained to the classroom. But generative is for the next class and then the next class can build on that so there is that kind of sustainability. And then I think once you kind of get your sea legs around that, then you can go into it. Or if you're willing to take the beautiful risk, dive in and get some colleagues that are in other disciplines or other subject areas that are willing to work with you or people in the community that be willing to work with you. So, I would say whatever you feel comfortable with is the way to answer that question. That's what's gonna work best, is what feels right for you and the level of risks you wanna take.

And these are beautiful risks. And by the way, our motto in Innovation House was 'This may not work, but we will learn from it'. And what we would do at the end of the year is we'd have a big public exhibition and I'd cater food and students had to share the stories of their projects, some of which were catastrophic disasters and some of which were great successes. But they all had to focus on what they learned. And some of the most powerful presentations were ones that didn't work out because of what they learned about themselves and time management and different things and what they would do differently. And so, even if the project doesn't work, learning is still gonna happen. So, I think that might help in taking that risk. Any other questions that you wanna...

ANAM JAVED:  
Yes, there's actually three more. I'm sharing that also with you so we can be conscious of time as well. There's a lovely comment from Miss Watt who said the better the prompts we put in, the more sophisticated the responses. And I imagine that adds to the earlier comment about AI being a tool and really us being the determinants of how well that tool works. But there's a question there stemming from your earlier conversation about the disciplines now talking about age groups and year levels. And it's from Chris who's asking whether, in your view, there are year levels or age groups where this sort of thinking can be embedded more easily or if it's the ideal starting point.

RON:  
Absolutely. So, first of all, going back to Miss Watt's point, that's very true, and learning how to write a very structured rule-based prompt. So, part of the way you wanna write a prompt is to provide rules for these bots. And you can use things like always do this, ask this. Do not go to this next question until they answer this question. So, you just wanna think about if you were facilitating or teaching something, how would you sequence it and then teach that to the bot? And I have a bot that will help you write prompts like that so you could search my name on the ChatGPT thing. So, that's a very important comment. And that really does determine the quality. As far as different years, age groups, the best thing I've ever seen is when I worked with an entire school district, which was K through 12, and I had all the folks there and then I kind of challenged them and the superintendent supported this to work across grade levels and have senior high students working with primary students and really coming up with projects   
that way.

That's a very generative way of doing it. So, if you can kind of blend across grade levels, that's very powerful 'cause it builds in mentoring and it's just a powerful learning experience. It can work at every grade level. I've seen it work at kindergarten level. You're just gonna need to kind of provide a little bit more structure and support and scale down the scope of the project. But even the youngest kids can do it with support. So, I think, again, really kind of scaling it down and thinking about the students that you're working with and meeting their needs. But any grade level it can really work. Multi-age is when it really becomes powerful. If you could pair older students with younger students, even a year or two older can be a powerful experience. But if you can get primary and secondary students working together, it's a really powerful experience. Thank you. Next question.

ANAM JAVED:  
Awesome. They're coming in thick and fast now, Ron, just as an FYI. There's another question from Sam Mackey, who is one of our resident master teachers for the arts. And Sam is wondering if in the spirit of creative agency, if you know whether there's been any research evolving regarding how students innately can play in the generative AI space, whether they're innately inclined to take to it a bit easier and more intuitively than perhaps we are.

RON:  
Yeah, I think this is such a nascent field, and it's changing so rapidly. But I haven't seen that research, although we are doing research on that, looking at how... For the research we're doing, we're looking at the logs like how frequently are people interacting. How are they interacting with those tools? So, we're looking at how students are doing that. But I think that's a very interesting question. And again, the best way to do that is just provide those opportunities again, structured, guided opportunities for students. But step back and see how are they playing with this and let them know this is something you can have a conversation with. And they are becoming increasingly multimodal. Even any of the bots on OpenAI, you can just use the app and talk. It could be complete auditory conversation, and it keeps the transcript. So, there's different ways of interacting verbally, written and through imagery. Now that I think could be powerful. So, it'd be interesting to see that's something to monitor.

Another question you wanna select from...

ANAM JAVED:  
Yes. Thank you, Ron. Ali's got a great one. Ali teaches visual arts from kindergarten to year six, so primary school kids. And Ali's just wondering if you recommend free apps that generate art. The reason Ali is asking is because there's obviously many apps that charge a fair bit of money but also perhaps aren't safe to use. Ali is also happy to get in touch with you directly with the contact details you've provided.

RON:  
All these big foundation models are moving towards multi... It's just inherently multimodal models that have voice, they can generate images, they can use images. And so, I would look at some of those and they do have free tiers now, and the models are very powerful. So, you can try that. I mean you can have students like upload a draft and try different variations on what they've already generated. I always encourage you to have students start with their own content, whether it's an idea or an image and work with that. But happy to follow up Ali and we can chat possibilities. Any other questions we still have a little time?

ANAM JAVED:  
Yes, I'll combine them in the interest of time. So, Kate's asked almost a philosophical question using the language you used, which is do you think all teachers have the capacity and capability to be gennai explorers, as you called them? And also, Brendan is asking if you think the move to process rather than product-based assessments. So, to tackle the cheating and the essays being generated. So, focusing on process is that the way forward, do you think, to elevate creativity but also make AI our friend?

RON:  
Yeah, I think those are great questions. I absolutely think all teachers and students have the capacity and capability. The willingness is a different question. So, creative agency is really boils down to three questions. Can I do this? And I think some people might not think they can because things are moving so fast they don't know where to start. And so, I think the earlier comment of 'can you play around with this'? Just play around with it. Just have a conversation with it. Ask it anything. You could say I have these three items in my refrigerator. What can I do with it? And start having the conversations. And I think you'll start seeing possibilities. And then the next question is, should I do this which is kind of a value-based question? And I think as folks start seeing examples like this, they could say, yeah, I think I should try this. And then the most important question is, will I do this? And so, will you take the time? And it doesn't take much time. You can just try out small, try something that maybe isn't working and working that way.

And so, leading to the process question, yeah, I think the process based is really good where you can kind of that's how I did that in Innovation House. The final evaluation was really telling the story of your work. The product almost didn't matter because I didn't want students who didn't produce a tangible product to feel outside of that celebration of learning at the end. But they still had to stand up there in front of anybody - we opened it to the general public - and tell the story of their project. And in that case, with the story of how their project didn't work but what did they learn? So, I think that's where we can kind of shift it a little bit, where it's not so much product. So, even if they are generating something, it doesn't matter if they generate this with AI not what did you learn from that process? And so, they still have to kind of take ownership over it. Any other final thoughts? We have one minute.

ANAM JAVED:  
That's great, Ron. I'm gonna use that one minute to just share some... You've answered all the questions, but there are some very affirmative, validating statements such as the one from Lauren here who says that I think that tools like this will help teachers to create deeper learning experiences for students, as well as save them time, especially when planning happens at the end of a busy and draining day. And then Miss Watt reaffirms by saying I've done some amazing lesson in unit planning with AI. The celebration, as you said, Ron, is having a go and just exploring the process and their learning and by breaking the rules and assumptions to create freedom of thought. Rose Truman simply wants to thank you for a very insightful session. And again, Ron, just giving you a last opportunity to respond to those lovely comments before I close the session.

RON:  
Thank you all, I know you had a long day. And so, thank you so much for joining and your very generative questions. And I really encourage you to take the beautiful risk, become an AI explorer. And I think just start with what you already know and what you wanna work on, and I think you will be pleasantly surprised at how these tools can support and extend your thinking so that we can educate for possible futures. So, thank you all so much, and feel free to reach out to me at any time. You see my website there, you can contact me through there. I might go to bed now. Get some sleep.

ANAM JAVED:  
Wonderful. Thank you so much, Ron. If you don't mind flicking to the very last slide. I believe Bruce Armstrong's face might be... Yep, that's it. Beautiful. I'll do the formalities now, Ron and you can kick back for a bit. Really quite a fabulous session. What you don't know, Ron, is there's a lot of back chats happening at the Academy where there's so many of our colleagues and our guests who are very, very excited to explore where they can take the learnings from this session too. And we can perhaps share that with you as well. We are so thankful to have you present and share your knowledge on such an important pressing topic. Thank you for joining us. What we want to mention to the audience is to look out for accompanying resources, a recording of this webinar but also PDFs of Ron's slides that will be hosted on the Academy resources page. What I will also be putting in the chat shortly is a link to the Academy's AI in schools page. It's like a one-stop shop where we will also host Ron's PL where you can access policies, blogs, podcasts, webinars galore on AI and they're all department-vetted and approved resources.

Thank you, everyone, for your participation in this afternoon's webinar. If you enjoyed this webinar on AI and creativity, we highly encourage you to attend the upcoming Thought Leadership series session. This is the last one of the year, so get in. It's called Leading Schools in Times of Disruption, and it will be delivered on Wednesday 28th August, same time, online by Bruce Armstrong. If you haven't already registered, I'll put the link in the chat very soon. And on that note, I'll thank everyone for joining us again and hope, Ron, that you have a good sleep after this excellent session. Thank you all.

RON:  
Yes, thank you all.