

Andrea: Right, hello everybody. Welcome to the online question and answer session. We've got Chris here with us at the National STEM Learning Center. Unfortunately, Dylan is out traveling, so he's not able to join us live in the room. However, he has kindly recorded responses to a variety of different questions that you've posed, so thank you very much for those.

They will be intercut throughout the question and answers that Chris and I are doing, so that you will get to see the answers and his thoughts and reflections. This is the assessment for learning in STEM teaching. Online calls hosted by FutureLearn, and we are currently in week four, so thank you very much everybody, thank you, Chris, off we go.

So let's start, Chris. So if we look first at a question that has been submitted by Daryl Sharp, he's asking what are some of the strategies for managing differentiation in pace? He finds it a bit of a dilemma how to come up with where students are and moving them on and having time and guidance for that as a teacher, what are your thoughts?

Chris: That's quite a tricky one to start off, [LAUGH] Andrea. One of the hardest things, I mean, assessment for learning, lots of teachers have been working on strategies for a long time to try and find out at where children are in their learning. But as the question rightly says, you'll find that some kids are at one point, other kids are at another.

Part of it you can do through pre-planning and thinking about the types of answers that children might give and therefore, what might be the next steps for them. But sometimes you just have to go on the hoof and go with how you feel about it. And what many teachers do, who are experienced in assessment for learning, is they think about grouping.

They think about, okay, so where are the children in my class, from how they've responded, who really need my help, who need my expert help as a teacher? Where are the ones who sort of just got something a little bit wrong but maybe if I put them with another learner who's a bit more proficient, they can actually help sort them out.

And so they use that different approach to moving forward.

Andrea: That's great, Chris. So, Daryl, Chris has got lots of really good ideas there for you. Sometimes it's planning, sometimes it's on the hoof, which actually thinking about how you're structuring students and not having to do it for everybody individually.

Chris: Yeah.

Andrea: Brilliant, Chris, thank you.

Dylan Wiliam: Freya Hanscom asks, how do we then move forward for the hinge question? I think one of the most important things about hinge questions is we should actually plan what we propose

to do before we actually start the lesson. So the hinge is in a certain place and we should have a fairly good idea what we plan to do before we actually even ask the question.

So if it's just yes or no, move forward or back, then that's great forward. If some students answer correctly and some students answer incorrectly, then one option is to get students to discuss their answers with a neighbor and then after they've had time to do that, so actually ask them to do it again.

And if that clears things up, fine but if not, the teacher might then lead a whole class discussion by asking, okay, so who thinks this, who thinks this? Students can vote and students can then explain their answers. Ultimately, it might necessarily lead to a piece of reteaching. The important point is that the aim of a hinge question is to keep things simple.

So, ideally, you'd like to reduce it to a small number of options.

Andrea: Moving on, our next question comes from Katie Russell and again, this is about recording and documenting children's responses. How much of it should we be documenting when using assessment for learning?

Chris: I don't know if you are a UK teacher but sounds to me as though you're certainly working in a context where there's a lot of accountability going on.

Andrea: Yeah, she is, Chris, she's UK, she's Devon.

Chris: All right, so yeah, getting the balance right between what you need to record in terms of reporting to your senior leadership team, and in terms of what you need to report to parents is one aspect of the assessment.

Assessment for learning is another, now it's not like they should be kept separate, it's just that with assessment for learning, you are recording what you need in order to move the learning forward. And then every now and again, distilling from that what you need for your reporting. So I just focus on the formative and think a little bit about as long as I am getting something on all the kids, say over a couple of weeks, on a particular topic, I am particularly recording things I need in terms of changing my teaching and my approach to learners.

That's sufficient and you're bound to have enough for reporting later. If you don't, slip in a few hinge questions towards the end and that will tell you how individual kids have done if you've not actually gone through.

Andrea: That's brilliant, thank you, Chris, some sage advice there.

Dylan Wiliam: Stephanie Hitchens says that she'd love to hear some ideas of what you do with information you gather from the hinge questions.

I think the really important point is ideally, you decide that before you even ask the question. In other words, the hinge question itself is designed in terms of the steps that you will actually take once you get the information. So at the simplest level, the hinge question either says to you it's okay to move on, you need to go back and make sure more students understand it.

Either by reteaching it in a different way or trying out some other approach like breaking students into pairs or groups for them to discuss their ideas. The really important point here is that formative assessment does not tell you what to do with this information. What we're drawing attention to here, is the fact that most teachers are making these decisions, do I go on, or do I do it again, without any evidence.

So the crucial idea here is that formative assessment doesn't tell you what to do with the evidence, it just tells you how to collect that evidence. What you do with it is a separate independent decision. It'll depend on how important the content is, where you are in the year, the opportunity cost of spending time reinforcing this versus going on.

I don't care what teachers do, I don't care whether teachers go on knowing some students don't get it. I don't care if student teachers go back and make sure that every student gets it, that's a personal decision for the teacher. What I do care about is that decision made by the teacher is made on a basis of evidence.

Andrea: Moving on to a question from Panilla Malchavist, she's worried about the immediacy of feedback. And one of the things that she's asked about is, if we don't have time to assess hand ins, test reports instantly, when it takes a few weeks to get them back, does the importance of feedback diminish with time, if it's not immediate?

Chris: Yes.

Andrea: [LAUGH]

Chris: You need to try and feedback while the children are still thinking about that particular topic and that particular area. Otherwise, they've gotta re-gain that thinking then and they've probably have moved on hopefully from that thinking when they answered those questions and did that particular activity.

So one of the things that many of the teachers we've worked with do is to think carefully about what work do they need to give feedback on and select that. And then, what worked, they just need to check or get one another to check or develop as a peer assessment exercise.

And working out a sort of repertoire of that, makes it vital for teachers, but at the same time, effective for learners.

Andrea: Absolutely, and that goes very much with the research I'm doing, so that's really interesting, really interesting, thank you. There you go Panilla, a short answer and extended ideas.

Thank you, Chris.

Dylan Wiliam: Fiona Moorhead has asked, how do I provision hinge questions in a whole class when there are learners with significant learning issues? An example she says is if you're teaching a science lesson and taking appropriate steps to differentiate practical activities through use of language, for example, when we assess, how do we assess everyone without creating subgroups for those learners who require additional support?

Well, I think there may be no simple solution here. It may be that you do need to carry on differentiating in the way that you have done so far. The important point is the question just gives you a better source of information about what to do next. But in general, as I said, peer tutoring, having higher achieving students help lower achieving students, doesn't just help the lower achievers.

It also helps the higher achievers because they're forced to think through their ideas more carefully.

Andrea: Moving on, next question for you, Chris, comes from Anne Connolly. She'd like to know, and I know there were several people I knew who asked this question as well, how to adapt the process for very low-ability students with poor social skills.

Cuz a lot of this stuff that we've been talking about in the course talks about students interacting with each other, and Anne's question is very much about the maturity level. What do you do when that is absent?

Chris: Try and build it as well as you can. I'm very much a believer in Carol Dweck's approach to learning, so very much a growth mindset in that however limited the behavioral learning behavior of your students are when you start, you can always get them better.

Students do want to do well, believe it or not, majority of them anyway. And so if you can actually help them to start by just simple things, like maybe advising one another on work before they hand it in, so helping one another check before they let teacher have a look at it.

Or dealing with things quickly by getting them to use mini whiteboards or to use ABCD cards or whatever so that their response is quick but also they see how you then respond to that, then that tends to it well. And praise them for the way that they're working rather than for being good at science, cuz they will know they're not good at science.

They've been sort of the losers in the game of competition in science, early on. But if you can praise them for their learning getting better and their learning in science getting better, then they respond as much as a high-attaining kid.

Andrea: That's really good. Thank you, Chris. Thank you, Anne.

Dylan Wiliam: Abby Voltis asks, what are some strategies you recommend to help formulate meaningful hinge questions? I think there are at least two different kinds of approaches. One, this comes from the work of Philip Sadler, is what you might call misconception-based hinge questions. He calls them distractor-driven multiple-choice questions.

So the idea is that we actually, maybe with our colleagues, brainstorm the misconceptions students might have around particular issues. We then write answers that would correspond to these misconceptions. We then write the question, and we then write the correct option. So that's a way of doing this, just brainstorm misconceptions with your colleagues.

The other alternative is to ask a hinge question as an exit pass question. So at the end of a lesson, two minutes before the end of a lesson, you might give students some index cards, typically 8 centimeters by 15 centimeters, and ask them to give you an answer, like why is it impossible to have a probability greater than one?

Explain the difference between mass and weight. And as the students leave the classroom, you take in these responses. They're called exit tickets, cuz students have to hand them in before they exit the classroom. The point is this. The most interesting incorrect responses from students will then make very good options for a multiple-choice question that can be used as a hinge question.

Andrea: I've got a question here from Terry Story. Terry says he's been using formative feedback for some years and has a bank of techniques she's fairly comfortable with. One of the things he'd like to ask you about is how to use feedback to take all learners forward. This is if some are showing that they've understood the learning and some haven't, so it doesn't feel that some students are just doing busy work but actually their learning is progressing.

Chris: I wonder, Terry, whether you've got some students there who may be pretty switched on to learning. I see a lot of teachers working terrifically hard on their formative practices but sometimes the learners aren't there doing their bit. And so it might be that you might need to do some more exercises with your learners in order to get them working better collaboratively and responding better to what you're actually asking them to do when you give them that feedback.

Again, I think if you build that contract through dialogue with them about why you're doing it and asking them what sort of things helping them with their learning, eventually most students will actually buy into it.

Andrea: Yeah, brilliant. Thank you, Chris. I hope that, Terry, gives you the ideas that you said were needed.

Dylan Wiliam: Jackie Ross's question is, are there any quick methods of assessing answers? I think we should go with multiple-choice questions. Multiple-choice questions have a bad reputation in science and maths education, because they are associated with low-level recall tests, particularly in external examinations. And I really don't think that they are very good for that kind of purpose.

I think they're excellent for use in classrooms when teachers wanna make a quick check on understanding. If you allow students to write idiosyncratic responses on 32 different mini-whiteboards, you've given yourselves a very, very complicated data-processing task. So my view is, multiple-choice questions preprocess the teacher's task. It reduces the complexity of the students' responses to a small number of manageable alternatives.

And because, as I mentioned earlier, in the answer to Abby Willcox's question, if you've actually formulated the options from well-known student misconceptions, why they're choosing those answers will be very clear.

Andrea: I've got a question here from Sabine Kumar.

Chris: Mm-hm.

Andrea: She's submitted a couple, but I think the one that we'll get Chris to answer for us, Sabine, is the one about what if the intentional dialogue that a teacher has planned, so this is a really, really interested question, turns into an idea that she had never thought of?

And how can she then keep conversation going in the right direction?

Chris: It's happened to me before, Sabine, and yet you take a deep breath first of all. [LAUGH] And you then use that delaying language that we all use where you say, right, that's really interesting. I'm just gonna think about this one.

Right, perhaps I can ask you to tell me more. So that the students start talking more and it gives you that opportunity to really key in then to what it is that they're saying, what it is that they're doing. Lots of teachers use things like who agrees with or who disagrees with.

The problem is if it's something that none of you thought about before, it's really off field. Maybe that's not a productive way to do it. But trying to bring the other students in once you get sorting out that problem or whatever new way of thinking about that chart has.

I mean, I've been amazed sometimes by what students have brought up in classroom.

Andrea: Mm-hm, yeah.

Chris: That seems so logical. I remember one, classroom, I was watching this teacher and she asked the children, well why do you have two lungs? And she wants to get out of it, the large surface area, the gaseous exchange.

One child said I know, I know, the blood comes from the rest of the body it goes into this lung, all right, and that one takes out the carbon dioxide and this one puts it back in. And it seems so logical that even me as a biologist I was thinking wow, well that's not right [LAUGH] .

But you have to back track a lot and go through double circulation and also some things to really sort that one out, but sometimes children come up with quite amazing things and that sentence, that's interesting. Let's think about this or tell me more is a way to give you a bit of wait time to do your professional thinking.

Andrea: Yeah, so wait time's a good plot, I sometimes use a Yoda ball

Chris: All right.

Andrea: Just questions [CROSSTALK] whoever is your favorite super hero, just touch and come back and get a bit of wait time I think that's a really good idea.

Chris: I park things I have a parking bit on my board where I write up questions that we're gonna deal with later.

And sometimes, I let it run out of time and leave it until next lesson, although I'd never leave it completely. But sometimes I need it until next lesson in order to give me that time to think about how I'm going to deal with it.

Andrea: Yeah. Brilliant. Thank you.

Great. Moving on then. Thank you, Sabine.

Dylan Wiliam: Claire Brown raises important issues about how we decide what to do next. Is limited time and the pressure is to always move on and cover the syllabus. Ultimately I think we have to basically make a professional judgement. Sometimes we go on knowing the students don't get it.

Sometimes we go back because we decide this is so important that everybody gets it. The important point is I know every teacher feels the pressure to cover the syllabus. Because if you cover the syllabus and students can't do something, that's their fault. But I think it's frankly difficult to justify moving on if few of the students in the class understand the issue at hand.

So I wouldn't want to see lots of different activities going on. I would like to see a smaller activities and in particular maybe helping the higher achieving students deepen their understanding by explaining it to others. It may seem counter intuitive, but in fact there's many research studies that show that when students explain things to each other, often the people that benefit the most are the ones who give help because they're forced deeper their understanding, to think through their days more carefully, more clearly.

And as Daniel Willingham says, memory is the residue of thought. Students remember what they've been thinking about and when you teach something to somebody else you're forced to think about it in a much deeper way and that's what creates long term memories.

Andrea: And some fellow just asked a question, would you use the term hinge point question with the learners and explain to them what they're used for.

Chris: Yeah, I think I could do that. Or I'd say, I'm gonna ask you a challenging question. I mean that might be it. What I want them to do is think really I really want you to think and give me your honest answer to this. So that's what is important.

So whatever you decide to call it, just tell them it's a hinge-point or tell them it's a challenging question. And I want you to say even if it's I don't know, I have no idea, that's important that I know that as a teacher.

Andrea: Yeah. Thank you. There you go Sam.

Question. Thank you for submitting it.

Dylan Wiliam: There's a question here from A Reed I don't know whether it's male or female, but the question comes down to is it true that the actual act of being tested helps people to learn and the answer is very simple, yes. Memory has two components, storage and retrieval.

You have to put stuff into your mind, into your brain. But you also have to be able to get stuff out, and most students that are preparing for a test, they tend to prioritize storage strategies rather than retrieval strategies. They re-read, they do key words, they do highlights what I hardly ever see a student do in preparing for a test is to read something, close the book and try to reproduce what they've seen.

But the research shows very clearly, that that's the key process is retrieval. Now tests, therefore practice retrieval. It turns out. But just making students do tests even if nobody marks the test actually increases long term memory. So tests will definitely help students learn. However students don't like tests, and that's why the best person to mark the test is the person who just took it.

Scientists in the United States have been exploring something called the hypercorrection effect. When students get answers wrong and find fairly quickly there after what the correct answer is they remember the answer for longer. So I recommend the teachers do multiple choice tests regularly and students do these tests, and then they check their own answers, and the teacher doesn't even record a score.

The benefits of testing come from students being required to retrieve answers from their memories and also finding a quick check. The hyper correction effect, when students thought something was right and find out it's wrong.

Andrea: My next question, Chris, for you comes from Aaron Mazari.

Andrea: I've got three questions here from Aaron, so that's why I'm just taking a little bit of time, I'm just wondering which one to ask because I think we've already answered Aaron those questions which was how to reach students in groups depending on their performance.

I think Chris has talked about grouping responding to them learning is the key thing to that. How to probe the minds of students if he's continually giving the wrong answer? Should we go through that one?

Chris: Yeah, so I think just say tell me more because students will talk themselves out of wrong answers even if it's just to say, gosh, I'm really confused here.

And then that gives you the opportunity to say to the rest of the class, okay, let's sort out Simon's, what Simon's thinking about here. I think, don't close that student down, because sometimes those reactions to questions are the answers that many of the kids are struggling with. Some kids are just comfortable about just saying the first thing that comes into their head.

Or it might be with this particular student you say, okay, when we've got a question coming up, I want you to think through and not try and answer until at least three or four other students have given an answer because that might give you more to base your answer on.

And you responding to what those three or four students are saying might be more useful in learning than just saying the first thing that comes to your head.

Andrea: Yeah that's great thank you very much Chris, I hope that helps everyone. Your other questions I do hope that we answer as we go through, I know that the second question I think about calculating the effectiveness of hinge point questions during lesson planning, we've got responses on that from Dylan so I think if you listen to what he says in the recalling that goes up that that will answer that question for you.

Dylan William: Lynn Bieber asks, how can we reduce paper based feedback but still have a record of ongoing dialogue? My advice, if you were to give oral feedback to students is to make them write the notes of your discussion themselves. So, you sit down with a student, give them individual feedback and then send them back to their seats to make notes about what it is that you talked about.

This has three benefits, the first is that it creates a written record of the event, the second is it develops literacy skills. And thirdly, it actually creates a reminder to the student about the substance of the conversation. The really important point is this is a way of actually doing good feedback, but at that the same time preparing evidence of that conversation's existence.

Too often, we worry about proving we've been doing our job more than we worry about doing our job. I think the important thing is to try to find strategies that allow us to do our jobs, and to capture

some of the evidence of that as a secondary consideration rather than the primary consideration.

Andrea: Moving on now to Sharon Colin. She's asking a question here which is really interesting, which is about should you always let the students know the answer to the hinge-point questions you've asked? Do you always give the answer at the point of the question? So it's an interesting question isn't?

Do we give the answers to hinge-point questions.

Chris: No, it's just an assessment tool for the teacher. It's not a learning opportunity necessarily for the student. There's no reason why later on when maybe they're doing revision of that topic, you can't go through the hinge-point questions use it more for learning.

But hinge-point questions come at a particular point in the learning cycle. It's that point where you judge that it's possibly time to move on in terms of conceptual understanding, so most kids have got it, a few won't. It's really key that it's there, but going through all of that could actually slow up the learning of those who've got it and it might not necessarily help the learning of those who haven't got it.

They just remember what they don't know rather than actually understand fully what's going on. So I wouldn't spend time doing that. Use hinge-point questions as a quickie to just find out where kids are.

Andrea: That's really good. So I hope that helps, Sharon. Thank you for an interesting question.

I'm sure we'll all appreciate you asking that of Chris.

Dylan Wiliam: Andrew Pierson asks how hinge-point questions fit in with curriculum coverage. In mathematics and in science, in many countries, perhaps even in most countries, the mathematics and science curricula are over full. There's just simply too much to teach in any reasonable allocation of time.

Interesting thing is, you can either try to cover everything just squeeze it all in, resulting in a curriculum that Bill Smith at Michigan State University called a Mile Wide and an Inch Deep or it could be a bit more selective. And the really crucial thing here is to realize not all content in the syllabus is equally important.

So for example, the particulate nature of matter is really important. I remember one teacher in King's Medway Oxfordshire Formal Assessment Project, KMOFAP, telling me that after really getting to grips with formative assessment, he now spent much more time on the particulate nature of matter. Because if students got the right models, they could actually make up answers to questions they've never seen before, because they could actually reason with those models.

So it's not about not teaching some topics and teaching others. It's about just shifting emphasis slightly and placing slightly more emphasis on those topics where they really go a long way. They're endearing ideas, they're really important for future development, and maybe delegating other ones to a kind of adjunct school assignment.

Maybe by watching a Khan Academy video, or just referring some students who really wanted to be able to get a 95 or 100% on the test, really need to be able to get those scores, maybe having them studying it from the textbook. Even if you want all the students to learn all of the material, it doesn't mean the teacher has to teach all of that material, especially if it's not really feasible for a significant number of students in the class.

Andrea: So we had a point here raised by Paul in the area where we were asking for the questions, Paul was asking and it kind of links to what Sharon was talking about. About flexibility, if students fail to grasp the concept. Paul's point was do we move to that spoon feeding delivery of actually telling them the answer.

So Chris, you started talking about that. What are the strategies do you think would be useful to use, rather than thinking that we have to go to that spoon feeding teaching approach.

Chris: Yeah, I mean time is always precious in the classroom. Everybody, whatever country I've been in, all teachers tell me the curriculum's far too big for the time that they've actually got to teach it.

But what I've seen work quite a lot when students actually get better with their learning behaviors as they work in assessment learning classrooms is they can do a lot of learning for themselves. So quite a lot of the teachers these days we see using, what's called flip lessons, where some bits of the learning are done by the students before they come to the lesson, so simple recall and learning of terms, definitions, etc.

Or just watching a quick video on something before they then come and do the more conceptually challenging stuff and teach it, save you lots of time. And so then you don't have to spoon feed. They've actually got their own spoons out and sort themselves out early on. And that leaves you more time to do it.

In Japan for example, the sort of lesson study things that they do there, they really do focus on the difficult conceptual things and the rest of the stuff is done outside of lessons. We would do well moving some other of our learners to that type of approach.

Andrea: Brilliant, thank you Paul.

So a good point and some great ideas there from Chris.

Dylan Wiliam: Kyra Helson points out that I often say that learners need explicit training in how to discuss their ideas with others. And perhaps I shouldn't use the word training, because what I really

mean is practice. So I don't know many formal training programs that will actually help students discuss their ideas with others.

But I think there are some things might be helpful. These come under the heading of sociocultural norms in some of the research. So some teachers find it very useful to say for example, that are only a certain number of torque moves that you can do. You might, for example, just me say I would like somebody to explain the reason for their answer, or you might say I have a different opinion, but you're not allowed to say that so and so is wrong.

Neil Mercer's work on dialogue in classrooms also discusses a lot of these kinds of talk moves. You can actually have a third student in the group who is meant to be looking at the conversation and enforces the kind of the rules or the guidelines that the group has set up for those conversations.

But really I would say it's just practice. As students get more practice at this they just get better at it.

Andrea: So the last question we're going to have and then I'm going to do a little but of summing up about what we've talked about. So this comes from Srija Kumari and I've asked this one last really cuz I think it's a really good way to round up what we've been discussing.

Srija's talking about the fact that they're going to plan to do some CPD about this course with other staff in their school.

Chris: Mm-hm.

Andrea: Their question is, of all of the strategies we've discussed, which is the easiest one to be implemented across different subject areas? They've called it a take-home strategy.

Chris: Right.

Andrea: What would you prioritize, Chris, on what we're doing, if there was gonna be something you think is a key point we need to share with colleagues.

Chris: I think, I'd actually find out what they're doing already before I make that decision because assessment for learning, formative assessment is not a new thing for teachers.

All teachers who believe in trying to find out what students think and want to move students forward have been using formative assessment. All that we have done in our work, and others have done when they're working on formative assessment, is help teachers strengthen those practices. Maybe find out where these strengths are already in your staff and then discuss what were the most useful thing to move, not just the teachers forward in their practice, but help particular learners, different classes will need different things.

It's more the students and where they're at in their learning behaviors that makes you choose a particular strategy over another. I mean, some schools do go for working on one particular strategy just so there's something that staff can communicate about. Whether it's traffic lights, or I know Birkwood School in London have got their purple pen of progress which they use and where the kids actually have to give responses to feedback in purple pen.

That is working for them as a means of having something for professionals to talk about, but I wouldn't advise that as a long term strategy. I'd advise much more as we're doing here. Thinking about where are your staff at? Where do they need to move forward and what are the best strategies to do that?

It's very much fitting in with this idea of differentiation. And as I sort of alluded to earlier, we are in the middle of developing the new online course on differentiated learning here at the National Stem Learning Center. Andrea and I have been working that for quite awhile, working some fantastic teachers in both primary and secondary.

And that will be coming out pretty soon. Keep an eye out on FutureLearn for when that's coming up. But it is that differentiated approach that we're after because of course that's what assessment for learning leads to. Assessment for learning gives you the evidence, your response, we talked about responsive teaching earlier, is usually differentiated and we can help you differentiate the learning on the next one.

But in the meantime, I'm sure you've got lots of ideas about taking that forward.

Andrea: Yeah, thank you Chris and thank you, Srija, I hope that helps. And also, as Chris said, to help you identify where your staff are at. And this is the beauty of the online course is you can download the videos, you can download the transcripts and you can take the questionnaires that we've given you and you could use those with your staff to start identifying their starting points.

And then you can tailor the CPD to meet their needs and help them move forward by drawing on what's their view as to the key things that are gonna be useful for you and your staff. So, it's not everything that we've done, it's the things that are gonna make a difference for you and your students, your learners.

Okay, so, I thought it would be useful, I am amazed as always at the ability of Chris to think about the variety of experiences that she's gotten drawing so many different ideas. Well, I thought we've had quite a few recurring themes coming out across all the various questions that have been answered, so I thought it'd be good just to sum them up.

And something that's come out really strongly, I think, from the discussion that we've had here, is this idea about questions being used to assess concepts. And thinking about the, not the facts and the knowledge and the recall of the teaching that we're doing, but actually the concepts that those facts and information link to, and how we're assessing that and building that.

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Something else that Chris has talked about really strongly is that learning is a cycle. And I think that's come out really, really well over lots of different people's questions, and then thinking about the questions we asked during that learning cycle, and how it links to what we're wanting to identify in the learners.

And then how we use the feedback in that cycle to respond to the evidence that we're getting and keep that learning going forward. We've also had the idea about connectiveness, about concepts linking and helping our learners understand more about a subject because we're starting to link those concepts and ideas.

And a big thing that's come out is about classroom culture. And the culture where it's about identifying learning and getting all students to feel that no matter what they're thinking, their ideas, they're all valid, they're all useful for us as educators to think about. So there are lots of strategies, we've had this idea about purposeful planning.

And then Chris has given some really good ideas about how we can actually manage that in classrooms where we have either in secondary, a high turnover of students, or in primary where we've got younger children, how we can actually get them engaged and how we can start grouping and organizing groups and using learning and the learners to help support each other.

So thank you, Chris. I don't know if you've got any other things that popped in your head cuz I think you've been answering questions, I've been kind of distilling that out. And if anything you want to add, but I'd like to say a big thank you to you.

Chris: Well, thank you, that's amazing Andrea, that's really good. I couldn't have done it myself like that, so that's really good, thank you.

Andrea: It's cuz I'm researching at the minute and coding and thinking about people's responses, that's why, very at the forefront. And a big thank you to Dylan as well, who I'm aware is not with us, but obviously it's the experience and the expertise that Dylan and Chris bring and that research, underpinning pedagogy, which really helps us all move forward.

So, I'm sure that as this is on YouTube and you can access it for a long time, you'll find that you'll keep going back to it and finding new things out, so thank you very much.

Chris: Thank you.

Andrea: Thank you.