

## Transcript: Technologies webcast presented to participants of the Intensive Engagement Activity – March 14, 2013

**Lynn Redley:** Hello, welcome to this webcast focusing on the Draft Australian Curriculum: Technologies that has been released for public consultation.

We're having a panel presentation and we're broadcasting today to participants of the Technologies Intensive Engagement Activity which involves over 50 schools and 160 teachers.

We're going to record this webcast while we're going and then make it available on the Technologies page of the ACARA website. So while most of the questions will be from, or all of the questions will be from people involved in the trial we're sure they'll be of interest to others who might wish to review the broadcast later, but also to those participants who aren't available today.

My name is Lynn Redley, I'm a Curriculum Manager at ACARA. Today I would like to acknowledge and pay respect to the traditional owners of the land on which we meet the Gadigal people of the Eora Nation. It is upon their ancestral lands that the ACARA office in Sydney is located.

Joining me today on the panel are three people. In the middle is Professor Lyndon Anderson from University of Canberra. Lyndon was the coach for the Design and Technologies writing team. He also was lead writer for the Shape of the Australian Curriculum: Technologies.

Chris Pilgrim sitting next to me is from Swinburne University of Technology and he was the coach for the Digital Technologies writing team. And Julie King down the other end of the panel who is the senior project officer for Technologies and she's responsible for coordinating the development of the Technologies Curriculum working very closely with the writing team and advisory group.

You'll also see on screen three others who I'd like to welcome. Three teachers via videoconference who are involved in the intensive engagement activity and will also be asking some questions of the panel today. So if each of you can wave as I introduce you that would be great.

Deborah Harris from Shailer Park High School in Queensland (Deborah waves on camera)

Matt Scott from Canobolas Rural Technology High School in New South Wales and did I say that right Matt? (laughter from all participants)

**Matt:** Pretty close, Canobolas.

**Lynn:** Oh Canobolas, Ok, from a non-New South Wales person then that wasn't too bad. Thanks Matt, and Sue Plumb from Yarra Valley Grammar School in Victoria. (Sue waves on camera)

Thanks Sue. What we're going to do in today's presentation, is have a brief overview of the features of the curriculum followed by each member of the panel responding to some

questions some of which have been raised in the first weeks of the consultation period from people who have been reading and viewing the Technologies curriculum and others will be as I've said from people who are on screen and then everyone will have the opportunity to email in questions that we can also answer so if something we say raises a question or if you've already got a question you can email them in to the address that Julie King gave you. We're now going to hand over to Julie and ask her to present a brief overview of the Technologies curriculum.

**Julie King:** Thanks Lynn, the Technologies Curriculum was released on the 19th of February and is available for consultation until the 10th of May. So the curriculum basically has been developed from Foundation to Year 8 in two subjects, Design and Technologies and Digital Technologies, and it's been developed from F to 10 in two year bands apart from F to two which is a three year band. So we have F to two, three to four, five to six and seven to eight and nine to ten. And from F to eight it is basically required that all students would have opportunities to learn Technologies with both of those subjects.

Then from years nine to ten they will be able to choose from two optional subjects that ACARA is developing so Design and Technologies and Digital Technologies again but they'd also have the opportunity within their own states and territories to continue to choose from the suite of Technologies subjects offered by those states and territories as long as those subjects don't duplicate what we're developing at ACARA. Each of those subjects has been developed in two strands or two related strands as Knowledge and understanding and the Processes and production skills so each of them has those two strands as their structure and that's really been to allow integration between the two subjects as well so we'll talk about that a little later on.

There's also the overarching idea of creating preferred futures and that was really strongly endorsed by the Shape of the Australian Curriculum: Technologies paper during consultation and also the project management aspect as a key idea was really strongly endorsed and really strongly reflected in both of those subjects. Thinking is obviously really important to any of the subjects in the Australian Curriculum but Design thinking is the focus for Design and Technologies Computational Thinking is a strong focus of Digital Technologies and both of them really contribute quite a lot to systems thinking skills and especially as it links to sustainability.

**Lynn:** Thanks Julie, one of the things you might be interested in doing a review of is the general capabilities creative and critical thinking skills as well just doing a little plug for those because at the end of January we published the latest learning continuum in the seven general capabilities, so while you've got some information in the Technologies Curriculum document you'll also get more information about critical and creative thinking in the general capabilities materials that that are also on the Australian Curriculum website.

What I'd like to do now is invite Lyndon and Chris to provide some opening remarks about aspects of the Draft Australian Curriculum: Technologies particularly those that are new and innovative and how this intends to benefit students. So, over to you Lyndon first.

**Lyndon Anderson:** Great, thank you Lynn, well there are two important features: preferred futures and design thinking. A focus on preferred futures ensures a contemporary approach to technology education and provides an active way for students to engage with the cross-curriculum priority Sustainability. Preferred futures involves students creatively and actively

designing sustainable and appropriate solutions to meet the needs of the present without compromising the ability of future generations to meet their needs. Design thinking and design process which includes the active production or making of design solutions progressively develops from the Foundation from the very beginning to Year eight and it also provides a foundation for students choosing to study Design and

Technologies in Year nine and ten or for other Technologies electives that may be available in the state or territory that the individual is at school in. Design thinking also provides all students with knowledge and understanding and skills that are transferrable to other aspects of their lives and of course to their future. It involves using strategies for understanding design problems such as visualising, generating ideas, analysing and evaluating.

**Chris Pilgrim:** Thanks Lyndon. It's the first time that Digital Technologies has been developed as a separate subject from Foundation to Year eight providing a progression to an optional subject in Years nine and ten. While students have been developing their skills in using ICT for some time and they will continue to do so across the learning areas through the ICT capability the focus in Digital Technologies now moves to students developing digital solutions. In the 21st century, digital technologies is an integral part of daily life. Students really need to understand how these solutions are developed. They do this by organising data, breaking down problems into components and then developing solutions using patterns and models. There is a strong emphasis on computational thinking. This contributes to students developing effective thinking and problem solving skills but also contributing and collaborating in digital environments.

**Lynn:** Thanks both Lyndon and Chris. We're going to move on to some of the questions that have been frequently asked or most commonly asked during the consultation so far, so, starting with Design and Technologies, **Lyndon can you talk a little bit about the rationale for selecting the four Technologies contexts?**

**Lyndon:** Yes, well the technologies contexts focus on the properties and characteristics of technologies, materials, components, tools and equipment and how they can be used to create innovative designed solutions. We've got four technologies contexts selected because they provide a progression into more specialised technologies subjects in Years nine and ten and they also reflect on current national priorities. The first is Food and fibre production which relates to national and global issues such as food security and sustainable food and fibre production. It is important for students to know and understand where their food and fibre comes from and they need to develop skills in creating designed solutions involving the production of food and fibre. Food and fibre production is the preferred term used by primary industries organisations and includes agriculture, horticulture, aquaculture and forestry to name a few.

We also have a context called Engineering principles and systems which are important for building Australia's know how in many of our critical industries. By focussing on this from the early years, all students, and that includes girls and boys, can develop an understanding that can lead to a greater awareness of what engineers do and we do need more female engineers at university. It also helps with the development of spatial cognition. The third one, food technologies in the early years can provide a connection with food and fibre production the paddock to plate approach. It also links really strongly with Health and Physical

Education in terms of nutrition. It provides the opportunity for students to design and produce products and services that promote health and wellbeing with a focus on food.

And the last of the four Materials and technologies specialisations is a context that provides flexibility for schools. Materials and technologies specialisations ensure that students have the opportunity to design, and make and evaluate products or environments that use particular materials or that expose students to the work of particular technologies. While the requirement is for these four technologies contexts to be addressed across a band, it is possible and likely that some schools will address more and the materials and technologies specialisation context provides that degree of flexibility.

**Lynn:** Thank you Lyndon. Now Chris, not quite the same question for Digital Technologies but its more around the key concepts that have been used, such as abstraction and data representation. Can you talk a little bit about why that approach has been taken?

**Chris:** Yes Lynn, there is a slightly different approach in Digital Technologies, the writers have chosen ten key concepts and presented these in five groups. The first of those is Abstraction, and abstraction is a generic cognitive skill. It supports Computational thinking and problem solving. It's particularly important when relating to the data representation and the specification algorithms and implementation content descriptions. The second is data. Data covers both data collection which is the properties, sources and collections of data. Data representation covers the symbolism and separation of data and data interpretation, which is all about patterns and understanding contexts of data.

Third, we have specification, algorithms and implementation. Together these are the building or the creating type contexts. In these we talk about descriptions and techniques for specifying systems and for algorithms describing how systems will work, and finally implementation is about the development of systems sometimes the programming, the building, the testing and the implementing.

The fourth group is Digital systems and this is really the artefacts of digital systems. The hardware, the software, the networks and the connections including the Internet and then finally and probably most importantly are the human aspects of digital technologies and this covers interactions and impact. So we'd look at the interactions between people and digital systems and data and processes but we also look at the impact covering issues such as privacy and Internet safety. So these concepts span the key discoveries of computer science and information systems and they're the basis for computational thinking. These concepts are likely to be the foundation of future systems so the curriculum is future proofed to some degree. They provide a common language for teachers in this subject and really should assist in discussions about the scope and sequence and its appropriateness for bands of learning.

The key concepts have been made much more accessible in earlier years by modifying the language. If we take an example and look at the building and creating group or specification, algorithms and implementation, this starts with developing an understanding of this concept using just a simple sequence of steps and decisions in F to two then moves into understanding problems in terms of data and functional requirements in Years three to six and finally students in Years nine to ten will precisely define and decompose real-world problems.

**Lynn:** Thanks Chris. One of the questions that writers grappled with when I listened into conversations during the process was around the relationship between Digital Technologies and the ICT general capability and that's a question here from the people who have been involved in the consultation: **Why is there both a Digital Technologies subject as well as a general capability focused on ICT?**

**Chris:** Yes Lynn this is a very common question. As I mentioned in my opening remarks, it is important for students to learn how to use ICT and this is the focus really in the General Capabilities continuum. But it's also important that students learn how to develop digital solutions, which is the focus of the Digital Technologies subject itself. A parallel is if we look at English in the Literacy General Capability or Mathematics in the Numeracy General Capability. Here, both English and Mathematics allow for explicit teaching of some key concepts. If we take an example, the issues to do with managing data or social and ethical protocols while all teachers would introduce these when introducing an ICT activity to students in other subjects, the depth in these is covered in Digital Technologies.

**Lynn:** Thanks. And Lyndon, **in Design and Technologies, there's clearly a strong focus on designing but, how much emphasis is there on making and developing production skills?**

**Lyndon:** Thanks Lynn. I know that this question has been asked a number of times. The Design and Technologies processes and production skills strand is based on the major aspects of design thinking and technology processes. Students spend a substantial amount of time engaged in developing processes and production skills. They learn a variety of skills and techniques relating to the technologies context they are addressing.

They adopt many project management skills, safe and sustainable work practices. They develop accurate production skills to achieve quality design solutions when using particular materials and tools. They select and use appropriate materials, components, tools and equipment and importantly they plan, produce and critique throughout the design process so, making isn't just about producing the finished piece of work, they'll be making prototypes models and mock-ups all the way through the design activity.

**Lynn:** Thanks. Getting back to you Chris, one of the questions that's come up is: **whether the focus of Digital Technologies is developing digital solutions or computer programming?**

**Chris:** Yes, thanks Lynn. This is a very common question. I was reading an article this week about an interview that Steve Jobs did in 1995, where he reflected on the importance of computer programming to cognitive ability. He said that every student should learn how to program a computer, because it teaches you how to think. He wasn't suggesting that everyone become a programmer, but rather they should develop computational thinking abilities. So, the answer is both. The curriculum does involve some computer science and programming knowledge, and, some digital solutions may involve programming and computer science concepts. However, the focus is on strengthening the computational thinking, the logic and the problem solving capabilities, and then applying these to a wide range of situations. It's also important that students learn through a project management approach. Project management is a generic skill relevant to a range of contexts and activities and by applying the key concepts, in doing so, it develops a deep knowledge and understanding of digital technologies.

**Lynn:** Thanks Chris. Okay, we have come to the end of the questions we've chosen to focus on from the consultation, and the teachers who are on screen with us today have some questions as well. So, Sue Plumb, if I can ask you to ask your question.

**Sue Plumb: Yes, I want to know if there are any indicative hours for the Draft Australian Curriculum: Technologies?**

**Lynn:** Okay, thanks Sue. That's one I'll answer. ACARA has indicative hours for every subject in the Australian Curriculum - we've got them for every subject, and so we do have them for Technologies as well. And we have them for each band of the curriculum according to the hours that the Board decided were appropriate in relation to the curriculum. But they're mainly for the writers in developing the curriculum because writers have to have some sort of a guide otherwise they're so passionate about their subject that they'd write enough material to cover the 25 hours that's available every week. So that's what it's there for, to ensure that there's a good balance across all of the learning areas in the school. And those are actually listed in The Shape of the Australian Curriculum, the broader overarching one on the ACARA website. And I think we also put them in the Shape of the Australian Curriculum: Technologies the specific ones for Technologies so that they're there for all subjects in the main Shape of the Australian Curriculum paper. But the key point that we need to make is that those indicative times are not designed to establish time allocations for teaching and learning in schools. So particular schools and school authorities will make those Policy decisions regarding what time should be devoted to curriculum in the particular school depending on needs and they can always do more. So Matt, I think you've got a question too?

**Matt: I do thanks Lynn, my question is, can you integrate the two subjects and integrate them with other learning areas?**

**Lynn:** Ok thanks Matt, I'm going to ask Julie to respond to that one.

**Julie:** Ok thanks for the question, so basically there are many opportunities for integrating, both within the subject and between the subjects and with other subjects. So when a teacher is developing a teaching and learning program you need to look at the two strands Knowledge and Understanding, Processes and production skills and think about how to do the integration between the two strands and that's particularly important we don't want students just learning about the Knowledge and Understanding. And then we also can have the opportunity of integrating between the two subjects so the reason the writers have developed the two subjects with the similar strand structure is that in some States and Territories and in some bands of learning it may be desirable to actually teach across the two subjects and teach them as an integrated subject. The other aspect with integration is with other learning areas so there are also many opportunities to integrate the learning with subjects such as Media Arts, Science, Geography and that's just to name a few.

So there's a lot of opportunities for teachers to be able to integrate. Certainly when the writers were developing the two subjects, they looked at the existing content descriptions from the other learning areas and considered where they could actually strengthen the links so they were really looking for the synergies between the two subjects, and that's why you'll see things like Engineering in Science and Technologies. There's a really strong link between the two subjects, and there's other links particularly within Food and Fibre

production for example and Geography and with Digital Technologies you can see the obvious links between Digital Technologies and Media Arts.

**Lynn:** Thanks Julie. Deborah Harris from Shailer Park High School in Queensland you've got a question?

**Deborah Harris: Yes, Thank you. What support is there for implementation of Digital Technologies in particular?**

**Lynn:** Thanks Deborah, I'll take that one, Chris could probably say a bit more about this but the Draft

Digital Technologies does represent a shift in expectation particularly at the Foundation to Year six levels, and we've had in response to the Draft Shape paper, we've had a lot of comments around implementation support. So what we did recently, ACARA facilitated a discussion with some lead organisations on implementation considerations. We talked not only about the need for teacher professional learning and resources that might be available to support teachers, but also going right to the basics with initial teacher education because ACARA isn't responsible for implementation support. ACARA develops the curriculum with all of the States and Territories but they're actually responsible for supporting schools in its implementation however we don't abrogate our responsibilities totally so that's why we've facilitated the discussion. So, each of the representatives from those organisations undertook to go back to their organisations whether they were universities or particular computer or digital professional associations to discuss the issues that we talked about there and we'll reconvene after consultation feedback comes in so we looked at particular aspects of the curriculum and what kind of support might be needed.

Now we're going to follow that conversation up shortly with a meeting that we convened with all the curriculum directors from around all the States and Territories so that we can do some sharing and work also with Education Services Australia that is developing a digital bank of resources as well that will support teachers but there will be some work done but I can't go into detail now about what that is Felicity Letch from St Mary's Anglican Girls School in Western Australia was going to be with us today on screen but she wasn't able to be but she did have a question which is **How does the curriculum provide opportunities for students to work on developing their creative skills, and also how can creativity be assessed?** So I'm going to hand over to Julie for that one.

**Julie:** Thanks Lynn. So this was quite an interesting question and certainly if you look at the content descriptions for Technologies they map really strongly to the general capability of Critical and Creative Thinking and if you look at the online version of the curriculum on the consultation site you'll see that the icons are there just as they are with the existing curriculum in English, Mathematics, Science and History etcetera, you can see the use of the icons and we have the little cogs icon coming up to indicate which content descriptions relate to critical and creative thinking.

When you look at the pdf of the Australian Curriculum for Technologies, you'll see there's a little acronym CCT against a number of the content descriptions, so that's your evidence of where a group of teachers came into ACARA and analysed our draft curriculum and they had particular expertise in some of the general capabilities areas so in their judgement this is where they thought the connections to each of the general capabilities occurred so that's

where that mapping has come from. Also, it's worth looking at, if you're actually trying to get an idea of how to assess creativity is to actually go and have a look at the Critical and creative thinking learning continuum. It's organised into four interrelated elements, so if you go into the Australian Curriculum site, if you go into the F-10 section of the website, you can find the general capabilities link and then you can go to each of the general capabilities. And two of these elements of Critical and creative thinking really tie in nicely with Technologies in particular. The generating element primarily consists of imagining possibilities and connecting ideas, considering alternatives, seeking solutions, putting ideas into action.

They're all words that we'd strongly associate with Technologies. Then we have the analysing and synthesizing element and that's drawing conclusions and designing a course of action. So obviously that ties strongly with design and process in Design and Technologies and to the development of solutions in Digital Technologies. So when you actually come down to assessing creativity, I think it's really important to go back to that continuum to help you because it is quite challenging to judge when a student is being creative because it can get a little bit subjective so I think using the continuum as a starting point is a really helpful thing. And if I give you an example, Year 4 students explore situations using creative thinking strategies to propose a range of alternatives, it's one of the dot points in the general capability continuum, and what does that look like in Year 8?

It's generate alternative and innovative solutions, and adapt ideas, including when information is limited or conflicting, so there is this increase in sophistication. So if you're looking at how to assess creativity, and you identify the elements you're particularly interested in, then looking at the Critical and creative thinking aspect of the general capabilities is a great way to kind of help you work out the pitch and what you would expect of a Year 4 or a Year 6 student.

**Lynn:** Thanks Julie. We've come to the part where we're going to answer questions from people who are listening in have emailed in. If anyone still wants to ask a question please do so and we've got a bit of time now where we can respond so you have the email address to the Technologies box and we'll start with one that we've received from Michael James, Kingston High School in Tasmania, and he's asked **What is the purpose of the band level descriptions?**

Now I'm going to have a go at that one, and Julie might want to jump in if she wants to talk about something specifically in relation to Technologies. The band level descriptions follow the approach that we took to the first learning areas that were produced in 2010 where during the revision to the curriculum, we decided that we needed year level descriptions. The reason for those year level descriptions was to provide some information that actually related to all of the content descriptions in a particular year level and so for Technologies the idea is the same but there's a bit of an overview of the content but we can talk about things that relate to every content description or on a number of content descriptions without repeating all of the associated information and it's particularly important for something like Technologies and Design and Technologies in particular, where there are a lot of contexts that could be covered. It's the same in the Arts where you don't want to have great long lists in each content description of all of the possibilities. There are also some things like cross-curriculum priorities that we have in the Australian Curriculum that are worth making

reminders about, so anything that relates to a number of content descriptions across the board.

**Julie:** I think that covers it really, one of the points in particular is around safety. We don't want to have to say in every content description; and do this safely, and do this safely and what does that look like at each band? So, in the band level description, we try and articulate what's the expectation of the level of safety and understanding, and so there's a gentle progression across the bands and that's articulated through the band level descriptions, rather than the detail through the content descriptions and that probably leads on to a question that's come in for Lyndon, and I'll get Lyndon to read that out.

**Lyndon:** Ok, so Duncan Gillespie from The Friends School in Tasmania has asked **if there is scope to simplify the wording of some content descriptions**, and he's numbered them but I won't mention the numbers, and the answer is yes, the process has been long, the consultation period has been long, and the wording has changed and sometimes it's been simplified and sometimes it may have got a little more complex but there are two ways that Duncan, you can help, you can provide a written submission or you could go to the online questionnaire, and give us a tip to what you'd like to see how you'd like to see it written, and we'll certainly take that on board and see what we can do.

**Lynn:** Thanks Lyndon. That's one of the things that some of you, particularly those of you in primary schools might have noticed in the way a consultation draft does differ from a final draft. In some cases there are small aspects of refinement in other cases they're quite large and people who are involved in the trialling of the curriculum like the participants in this broadcast today are actually the ones who can provide us with the level of detail that we need to be able to modify content descriptions so that they are useable in the classroom, clear and understandable.

I think that leads on to another question that we've had from Andrew Upton from Koorringal High School in New South Wales and that is about **the purpose of the elaborations**. So again I'll start and Julie might want to give specific examples in relation to Technologies. So, the model for the Australian Curriculum is that the key content is the rationale, the aims, the content descriptions and the achievement standards. And the achievement standards necessarily need to be supported by work samples, to bring them to life if you like and that's one of the things that we're hoping to get from teachers involved in this intensive engagement activity but the content descriptions should be fairly stand alone, however, they are necessarily broad in lots of ways, and the elaborations are there as illustrations of ways in which a teacher might develop a teaching and learning program, or to develop a shared understanding of teachers about the possibilities within a content description.

They're not meant to be finite let's tick them off we'll do all these content elaborations and then we'll have covered the content description, that's not the way they've been written, it is to provide examples of approaches. They are not a mandated part of the curriculum, it's the content description and the intent of that that's important. In Technologies there's been a really positive response to the elaborations particularly in Digital Technologies where some of the concepts are new to people and the elaborations are quite helpful. There is no reason why the states and territories or individual schools can't write their own elaborations of a content description to help the people in a particular area that are implementing that curriculum to develop an understanding. Do you want to add anything Julie?

**Julie:** I think we've been fairly comprehensive in the range of elaborations that we've provided and it's a really important message for you to pass on to people that you have come in contact around discussions around the curriculum because it can look quite dense when you look at it as a pdf you're looking at a content description and then half a dozen elaborations after it, and everybody thinks we have to teach all of those dot points, and the message needs to go out that it's the content description and the elaborations are there just to help people understand what that really means in their classroom, and to give some hints about this is what you would do. They're not anticipated or intended to be taught by every single person.

**Lynn:** Lyndon or Chris, do you have any, well it's a bit hard to ask if you have an example, but, any thoughts about the relationship between the two as writers were developing the curriculum, between content descriptions and elaborations?

**Chris:** I think for me the Digital Technologies writers found the elaborations really useful, enabling them to explain the content descriptions as they were working. The elaborations did change and I know we had movement between the elaborations and the content descriptions and there was some work to get that blend right, but the way I see it is the elaborations will enable the curriculum to be explained into the future into new contexts allowing the content descriptions to stay static, particularly with Digital Technologies as new techniques and technologies and methods emerge into the future.

**Lynn:** Yeah, that's a really good point because the content descriptions couldn't identify too much of the technologies that currently exist. There's broader descriptions of those. We have another question here from Lucinda Raedel from Lucindale Area School in South Australia, Lyndon this one's for you. **How is agriculture addressed in the Australian Curriculum?**

**Lyndon:** Thanks Lucinda, well since the very beginning of the shaping phase, consultation with the agricultural industry sector and educators was open ended, we had very interesting discussions and agriculture's actually purposefully put within one of the four context areas Food and fibre production. It was always our intention to work strongly with the agricultural area and make sure they were represented and the interests were there so students would have the capacity to enter that profession if they so desired. But there's also further work being undertaken to map agriculture against other learning areas such as geography and science which would be evident in content descriptions and that of course allows for related themes to be developed and a degree of integration between those learning areas. Hopefully it's being looked after in the area.

**Lynn:** Good thanks Lyndon. I think that brings us to the end of the questions we've received, no more questions? Ok, so unless any of the teachers that we have on screen have any other questions? Can we have nods or shakes? (teachers on screen shake their heads) No, not at the moment. Well, I'd really like to thank both the panel for being here today to answer some of those questions and all of the participants for your questions and responses. I would encourage you to get online to complete the online questionnaire, or to send a written submission. The questionnaire is comprehensive and it does give you the option to provide comments on particular aspects. So the consultation period closes on Friday 10 May. It's given us a twelve week period we've taken into account the school holidays because normally we have a ten week consultation period. But we're really looking forward to seeing

some of the responses that we get about the curriculum before we start the intensive work of analysing the data and then refining it in the final version of the curriculum. So thank you everyone and goodbye. Thanks everyone. (teachers on screen say thank you and wave goodbye)