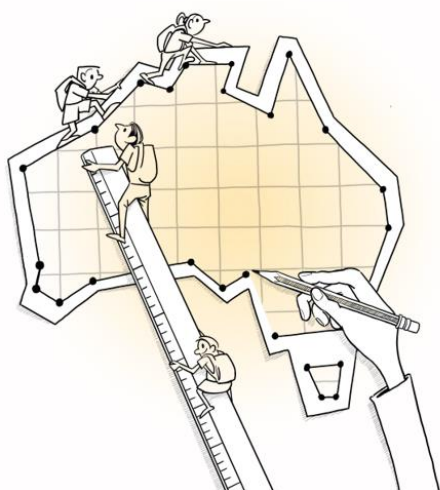


EDUTECH – KEYNOTE (20 MINS) – 10 August 2022
OVERVIEW OF AUSTRALIAN CURRICULUM CHANGES

open the Digital Curriculum Congress on Day One of EduTECH. (followed by panel)

acara AUSTRALIAN CURRICULUM,
ASSESSMENT AND
REPORTING AUTHORITY



**Technologies in the new
Australian Curriculum:
Overview of the changes**

EduTECH
10 August 2022



Introduction

Before we commence, I wish to acknowledge the Traditional Custodians of the land on which we are meeting, Wurundjeri Woi Wurrung peoples of the Kulin Nation. I pay my respects to their Elders, past and present, and the Elders of other communities who may be here today for they hold the memories, the traditions, the culture and hopes of Aboriginal and Torres Strait Islander Australia, and by extension, all of us.

In April this year, all Education Ministers approved the new Australian Curriculum, version 9.0, after the first comprehensive review since 2014.

Today I am going to talk about that, how it relates to Technologies education and what that means when it comes to the classroom. But first, a bit of background.

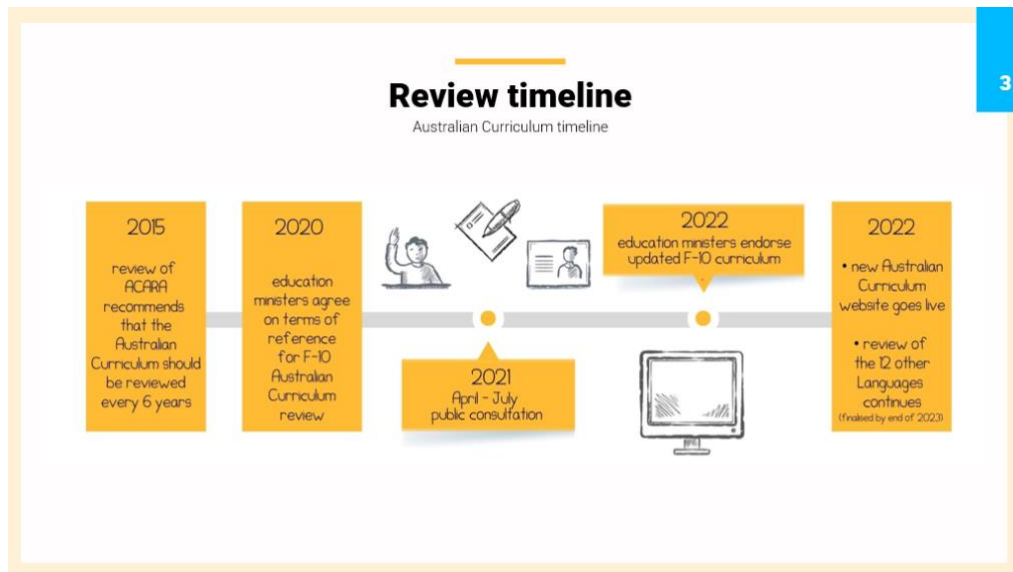
Australian Curriculum - Review

**Background, process and
timelines for the Review**

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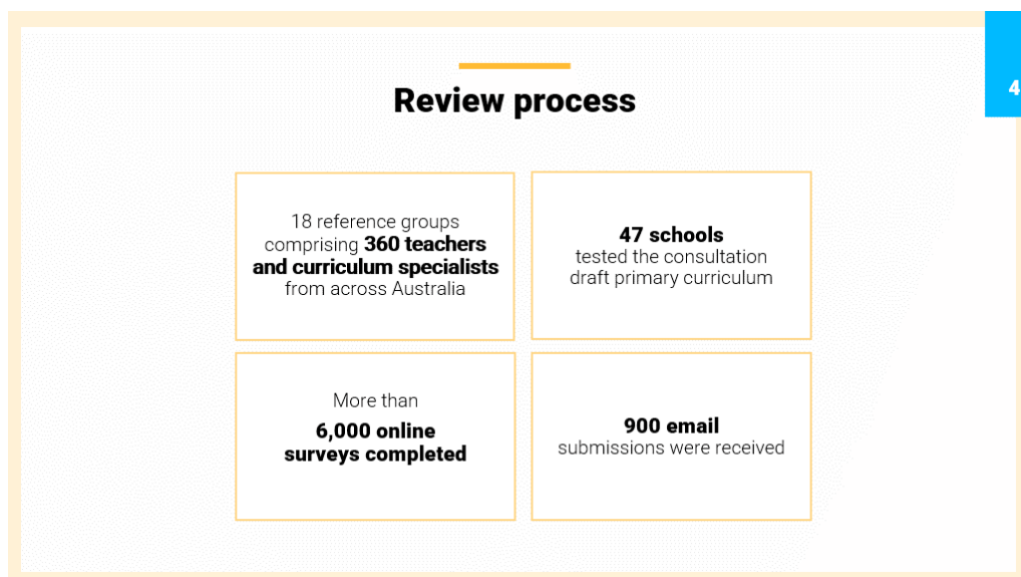
In 2015, Ministers agreed that the AC should be reviewed every 6 years. The last review was undertaken in 2014 so in 2020 Ministers gave ACARA ToR for a review and asked to complete the review by the end of 2021.



When we released a consultation draft of the Australian curriculum last April, it was the first time that such a draft had been open to the public as one document for feedback.

On the basis of the feedback we made substantial changes to the final draft that was eventually endorsed.

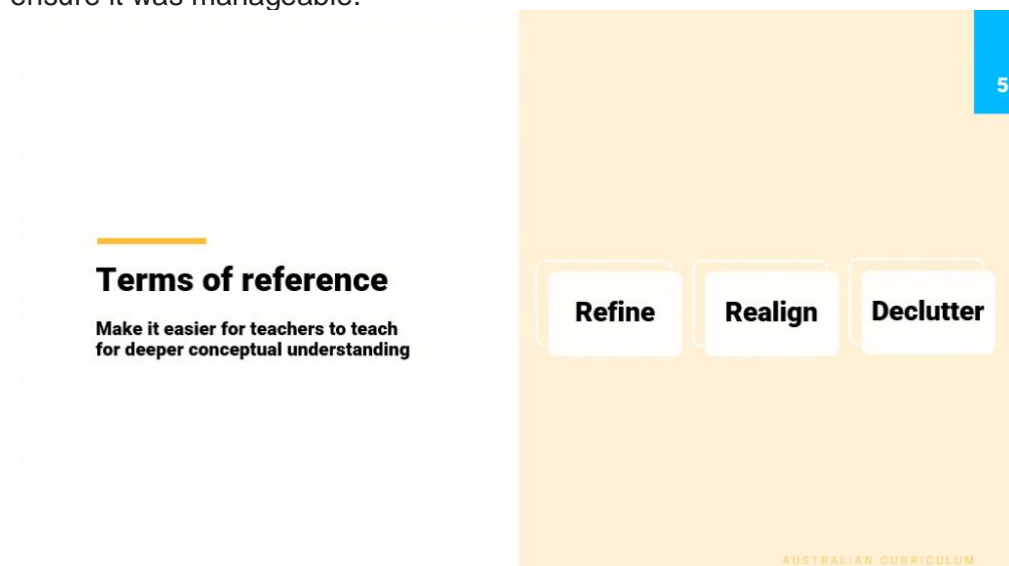
So the consultation we did with the community and with the teaching profession was essential and influential. The Australian Curriculum must represent broad community consensus and be based on well-informed and researched evidence.



We set up 18 reference groups involving 360 teachers and curriculum experts. Thousands of online surveys were completed and email submissions received, with the Aboriginal and

Torres Strait Islander Histories and Cultures cross-curriculum priority, English and Mathematics receiving the most attention.

We also had detailed written feedback from all jurisdictions and sectors and our Primary School Intensive program meant we had 47 schools road-testing the draft curriculum to ensure it was manageable.



Our driving focus through the consultation was the direction from the terms of reference, which asked us to **refine, realign and declutter** the curriculum, which meant substantially reducing the amount of content to make it more teachable, and so teachers could linger longer on particular topics to ensure deep conceptual understanding, not just surface knowledge a large number of facts. We ended up with 21% less content descriptions across the whole curriculum.

One of the ways we really facilitated that streamlining was with our new Australian Curriculum, Version 9.0 website. It's not just the host for the updated curriculum but is one of the few digitalised curriculum websites in the world, with interactivity and features that will make it easier for teachers to know what has to be taught and to plan their work.

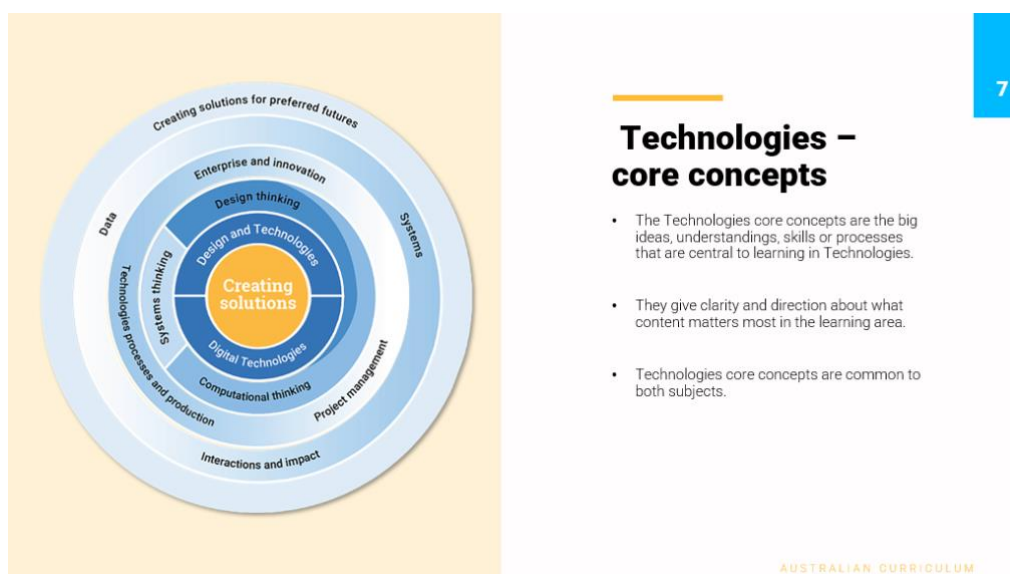
The way the new website will support teachers is significant and our Technologies specialist Kim Vernon is going to speak to this in her presentation later so I will talk now about the aims and structure of the Technologies curriculum and how the feedback from the consultation drove the finalised version of the curriculum.



TECHNOLOGIES IN THE AUSTRALIAN CURRICULUM

When we did the Review we knew Technologies was one of the Learning Areas that was going to be of particular interest for teachers.

Before going in to specific changes, it is worth having a brief overview of the structure of the Technologies Learning Area, which is built around the purpose of technology which is to create solutions to problems.



The Australian Curriculum: Technologies Foundation to Year 10 comprises 2 subjects, each of which are informed by a range of core concepts:

- **Design and Technologies**, in which students use **design thinking** and technologies to generate and produce designed solutions for authentic needs and opportunities
- **Digital Technologies**, in which students use **computational thinking** and **systems thinking** to define, design and implement digital solutions for authentic problems.

Both these subjects are designed to introduce students to a range of what we call “core concepts”. The Technologies core concepts are the big ideas, understandings, skills or processes that are central to learning in Technologies.

It is important that teachers understand these core concepts in order to effectively teach the related knowledge and skills to students.

The core concepts also include:

- Enterprise and innovation
- Project management
- Processes and production
- Data
- Systems
- Interaction and impact.

The core concepts give clarity and direction about what content matters most in the learning area and are important because they provide teachers with a high-level view of the essence of the learning area or subject. With the fast-paced changes to digital tools, the core concepts allow for the foundational elements of the subject to always be at the forefront of the learning, allowing students to transfer their knowledge and skills regardless of the evolution of technology.

It is particularly important to ensure our Technologies subjects, in particular Digital Technologies, were up to date, relevant and, of course, teachable.

How we equip our digital generation with the knowledge and skills to be creative and innovative in their thinking and problem solving, while also fostering resilience and a spirit of considered risk-taking has never been more pressing.

Technologies enrich and impact on the lives of people and societies globally. They can play an important role in transforming, restoring and sustaining societies and natural, managed and constructed environments.

They can also have the opposite effect if not used wisely. Think of the smart phone and how, in combination with social media, has contributed to an epidemic of mental health issues among teenage girls.

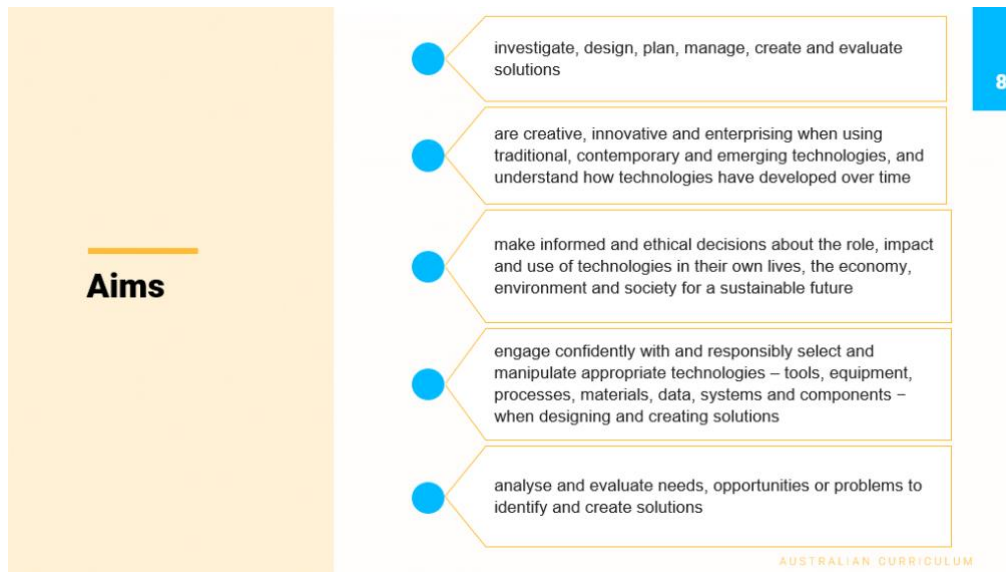
As a country we need resourceful and innovative people who can evolve the development and ethical use of technologies, develop solutions to complex challenges and contribute to sustainable patterns of living.

All young Australians need to be able to develop a capacity for action and a critical appreciation of how technologies are developed and can contribute to society.

By applying their knowledge and skills when using technologies, students can create innovative solutions that in many ways become the scaffold of future generations.

Technologies as a learning area can enable students to work independently and collaboratively to develop knowledge, understanding and skills to respond creatively to current and future needs and opportunities.

And the practical nature of the Technologies means students are engaged in critical and creative thinking including understanding interrelationships in systems when solving complex problems.



Aims

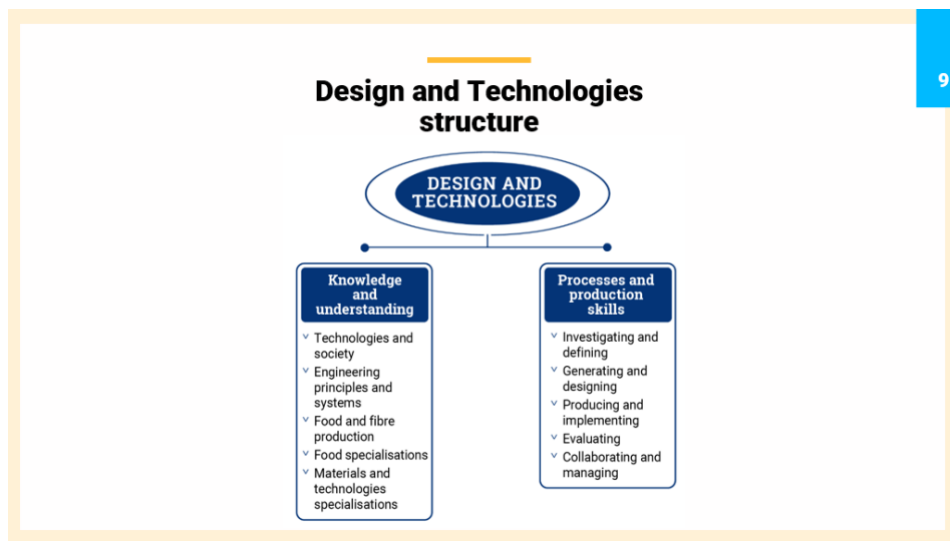
The Technologies curriculum aims to develop the knowledge, understanding and skills to ensure that, both as individuals and as collaborators, students:

- investigate, design, plan, manage, create and evaluate solutions
- are creative, innovative and enterprising when using traditional, contemporary and emerging technologies, and understand how technologies have developed over time
- make informed and ethical decisions about the role, impact and use of technologies in their own lives, the economy, environment and society for a sustainable future
- engage confidently with and responsibly select and manipulate appropriate technologies – tools, equipment, processes, materials, data, systems and components – when designing and creating solutions
- analyse and evaluate needs, opportunities or problems to identify and create solutions.

Content in Design and Technologies and Digital Technologies is organised under 2 related strands:

- Knowledge and understanding
- Processes and production skills.

For example, here is how Design and Technologies is structured:



As you can see, under each strand, curriculum content is further organised into sub-strands.

Students apply skills from the *Processes and production skills* strand to the content from the *Knowledge and understanding* strand.

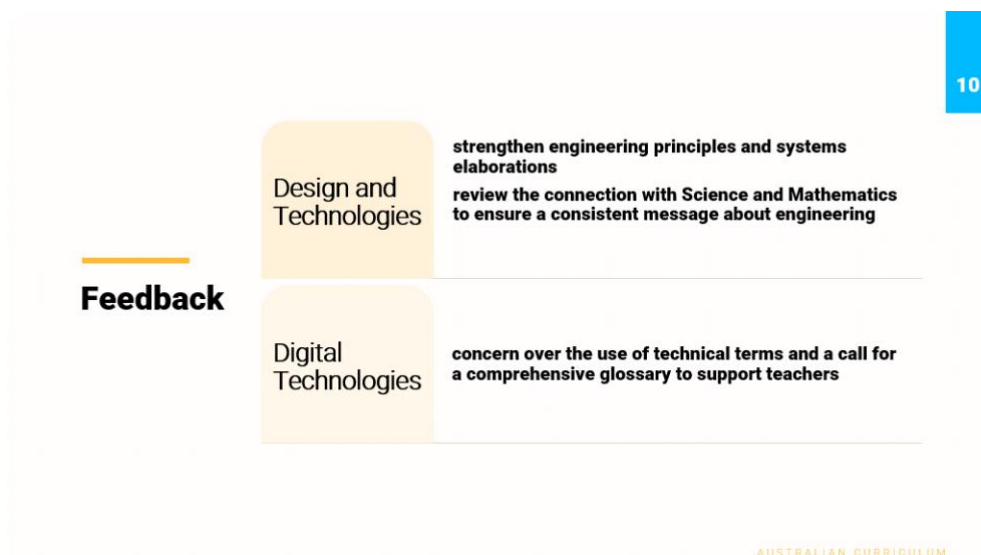
This helps with an integrated approach to teaching Technologies.

FEEDBACK

I'll return now to the feedback received on the consultation draft and the changes we made in response. The feedback confirmed that the proposed revisions for each learning area were an improvement on the current Australian Curriculum, Version 8.4:

- the introductory sections were more helpful,
- the content had been reduced, and
- achievement standards and content descriptions had improved in their clarity across all learning areas.

But - it wasn't all positive. There was **further** work to be done to reduce and refine curriculum content.



There was also a high level of feedback and public comment in relation to specific aspects that required further attention. The main themes were:

- in **Design and Technologies**, a need to strengthen engineering principles and systems elaborations and review the connection with Science and Mathematics to ensure a consistent message about engineering across the curriculum
- in **Digital Technologies**, there was concern over the use of technical terms and a call for a comprehensive glossary to support teachers

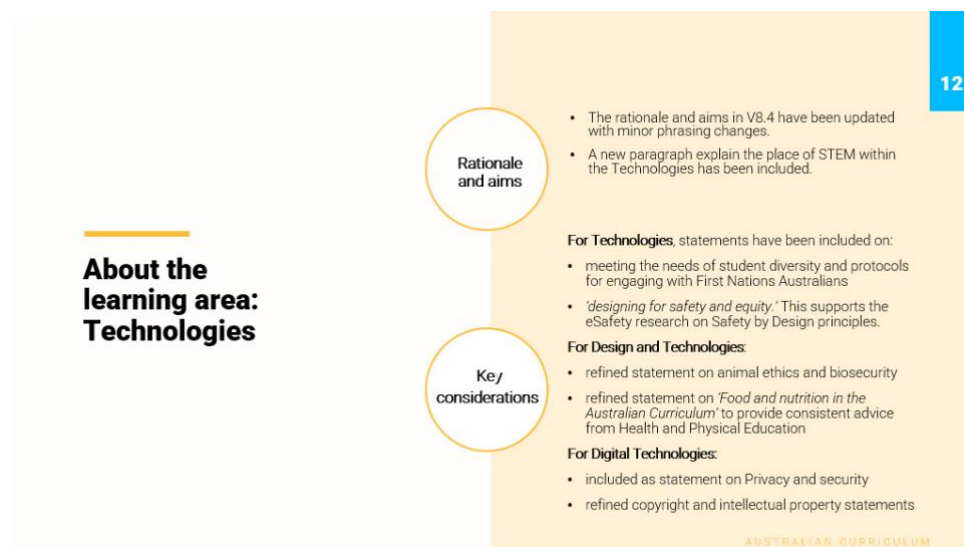
We listened carefully to that feedback to hear what the community and especially what the teaching profession had to say.



KEY CHANGES - TECHNOLOGIES

In response, we have made a number of changes to the Technologies curriculum. In doing so, our key focus was on the essential knowledge and skills students need to navigate the digital world. With that in mind, we had a particular emphasis on a few main things.

The overall structure of each learning area starts with introductory material about the Rationale and Aims and Key considerations.



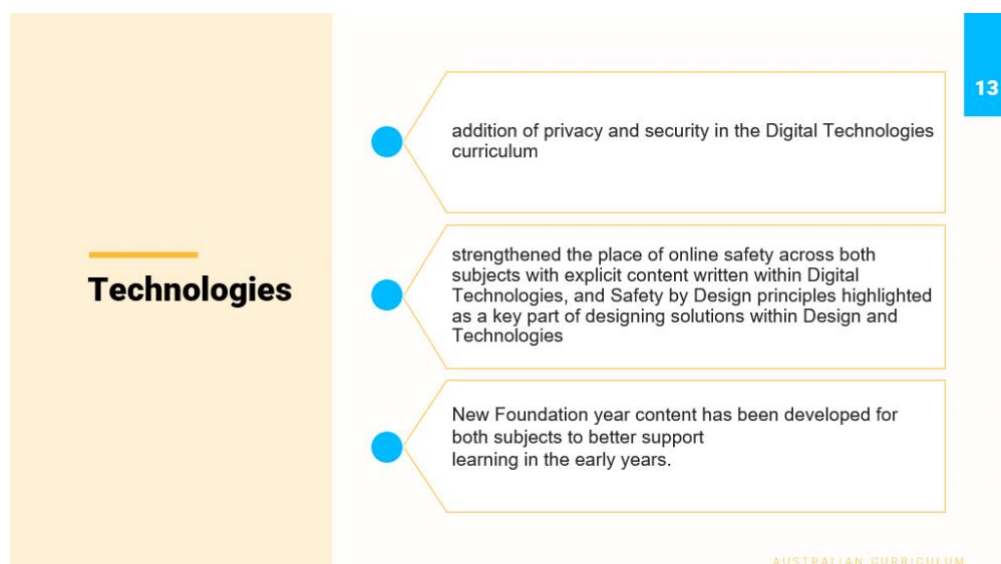
In the Rationale and Aims section, we have a new paragraph on the place of STEM education in Technologies.

In the Key Considerations section, we have new general statements about meeting the needs of student diversity, protocols for engaging with First Nations Australians, and designing for safety and equity.

We have new statements specific to Design and Technologies relating to animal ethics and biosecurity, and about how food and nutrition relates to the Health and Physical Education curriculum.

Specific statements on privacy and security, and copyright and intellectual property rights have been included or refined within Digital Technologies.

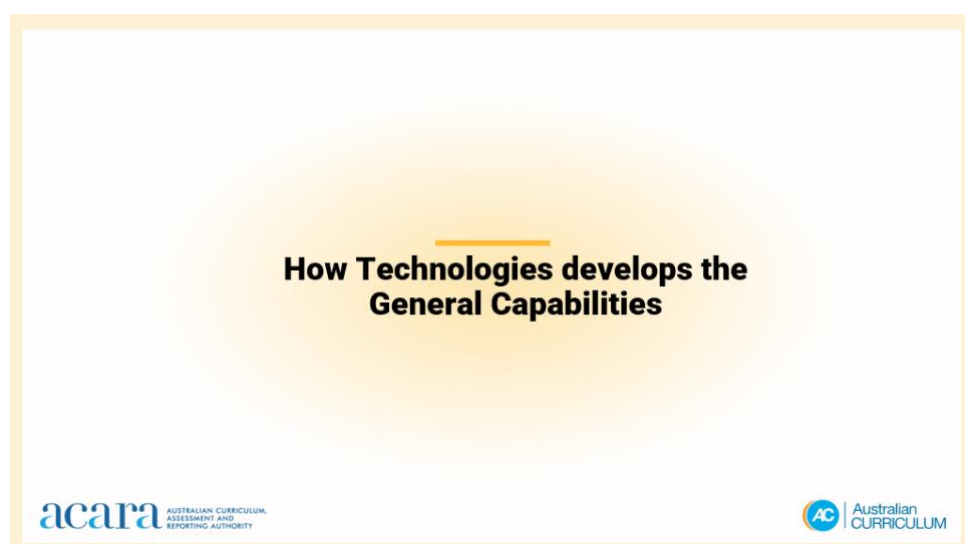
These changes flow through to specific content descriptions and elaborations



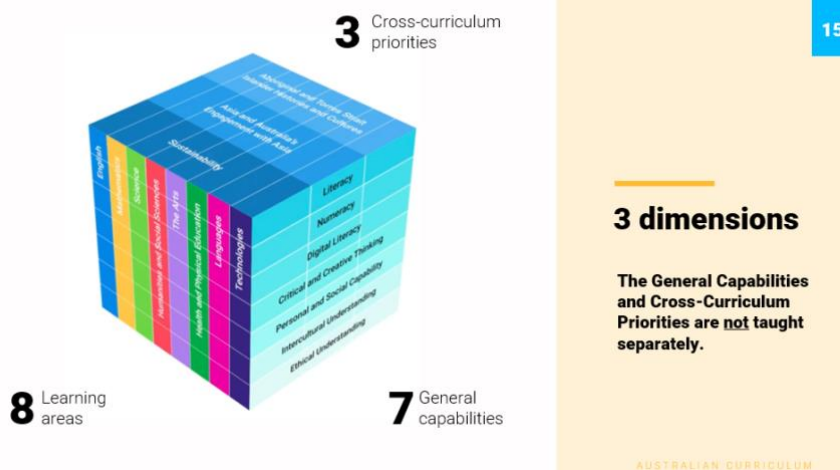
An important change is the inclusion of privacy and security which is now a core concept. Australia's cyber security strategy 2020 outlined the important role everyone plays in providing a secure online environment in a world where we have never been more interconnected. This new inclusion helps position our students to play a positive and confident role in protecting themselves, their families, their communities and the nation as a whole from a range of emerging threats to our privacy and security.

Significantly, we have strengthened the place of online safety across both subjects, and Safety by Design principles have been highlighted as a key part of designing solutions within Design and Technologies.

One key change is that we have separated the foundation level out from Grade 1 and 2 so that teachers can really focus on foundation skills and what is essential learning. This was an important part of the decluttering and refining task.



As part of the review, we clarified the relationship between the three dimensions of the curriculum, that is, the 8 learning areas, the three cross-curriculum priorities, the seven general capabilities. We wanted to be clear that learning areas have primacy of place in the curriculum. It is through them that the general capabilities are developed.



When it comes to Digital Technologies it is not just about the content and the devices – it is about the underlying thinking skills and the capabilities.

Digital Literacy is one of the general capabilities, and a fundamental component of literacy learning. It can be looked upon as an extension of the foundational literacy skills of reading, writing, listening and speaking. Literacy has always been an essential vehicle for the acquisition of knowledge; however, with our ever-increasing engagement with digital tools, we require the development of knowledge, values, communication and critical thinking relevant for the information or digital age.

Technologies is a learning area that can be enriched by the Sustainability cross-curriculum priority, and in which the general capability of ethical understanding and critical and creative thinking can be developed.

Ever since Sir Francis Bacon, the father of modern science, declared that “knowledge is power” and that the role of science was to “torture” nature in order to extract its secrets, the issue of how human beings use their scientific knowledge and apply it in the form of technological power has been thrown into sharper focus. Just because we CAN do something, does that mean we SHOULD do it? A fully rounded education needs to help students think through that question. For example, think of the ethical dilemmas presented to those who discovered the explosive power of nuclear fission when it was realised that bombs could be built that could wipe out entire cities.

And what do we do with the scientific knowledge we have achieved about the damage being done to our own habitat by the application of technologies we have come to depend upon? If we knew then what we know now, would we have made different decisions?

So ethics is not only to do with the conduct of scientific research, but also with the uses to which its output is put. In July 2017, New Scientist Magazine published “The Ethics Issue” in which it posited the following questions:

Should we give (or recognize) "rights" for other animals?

Should we edit our children's genomes?

Should we make everyone "normal"?

Should we abandon privacy online?

Should we build robots that kill?

Should we let synthetic life forms loose?

Should we geoengineer the planet?

Should we introduce population controls?

Should we colonise other planets?

- New Scientist Magazine

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Ethical Understanding

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Should we give (or recognize) "rights" for other animals?

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Should we introduce population controls?

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The study of Technologies can be enriched by finding ways to help students think through such issues.

Looking at another of the general capabilities, critical and creative thinking has been at the centre of an important educational debate over recent years about the relative importance of subject area content knowledge and associated skills. There has been a false dichotomy set up between those who say the curriculum should focus on knowledge rather than capabilities, lining up opposite those who say we need to focus on capabilities because facts can now just be looked up on the Internet. We need to avoid perpetuating such a simplistic false dichotomy between factual knowledge and capabilities.

Critical and Creative Thinking



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“Generic skills only have meaning within specific domains of knowledge”...
“What’s the use of learning to collaborate if you don’t have anything distinctive to contribute?”

- Alan Finkel
Australia’s former Chief Scientist

AUSTRALIAN CURRICULUM

This is because, as the former Chief Scientist, Alan Finkel was fond of saying: You can’t engage critically and creatively on a topic if you lack the relevant background knowledge. When you’re thinking critically and creatively, you’re thinking ABOUT SOMETHING.


But for knowledge to serve critical and creative thinking and problem-solving it needs to be **appropriated** by the student, that is, understood.

A student may “know” rules in programming logic such as ‘IF’ ‘AND’ ‘OR’. They can “know” this simply by accepting it on trust from their teacher who tells them what they are, and then memorising them. But do they understand why they are important and when they should apply them in different algorithms to solve real-world problems?

The joy of understanding, the joy of the moment of insight that comes from experiencing and **noticing for themselves and in themselves** that their knowledge of the world is expanding, this is not something that can just be had by memorising content told to them by the teacher. This joy of understanding is what makes learning exciting.

Moment of insight

“Aha! Now I get it!”



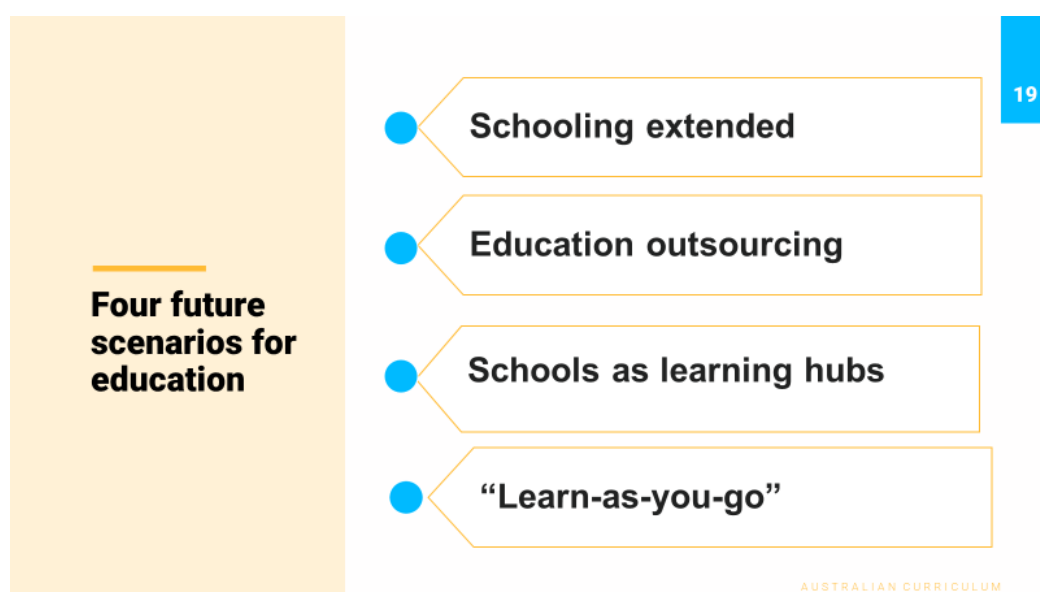
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And it’s what makes teaching exciting. Seeing the look of excitement on the face of the student when they experience that “aha!” moment of insight, when they “get it”.

If we want our young people to be creative and critical thinkers and problem solvers, then it is crucial that factual knowledge about a topic is taught in ways that promote understanding.

Depth of understanding is built up over time, which is why, in the updated Australian Curriculum, we have had such a focus on decluttering so as to create more time for teachers to teach key concepts and facts in a way that deepens understanding and makes it possible to think critically and creatively about a topic and solve related problems.

Before concluding, I'd like us to take a minute to reflect on how technology is going to affect education into the future at a very high level. In 2020, the OECD offered four scenarios for the future of schooling. Scenarios are not predictions, but rather plausible narratives about how the future might evolve from here.



The first is "Schooling extended": Participation in formal education continues to expand. International collaboration and technological advances support more individualised learning. The structures and processes of schooling remain.

The second is "Education outsourcing": Traditional schooling systems break down as society becomes more directly involved in educating its citizens. Learning takes place through more diverse, privatised and flexible arrangements, with digital technology a key driver.

The third is "Schools as learning hubs": Schools remain, but diversity and experimentation have become the norm. Opening the "school walls" connects schools to their communities, favouring everchanging forms of learning, civic engagement and social innovation.

And the fourth is "Learn-as-you-go": Education takes place everywhere, anytime. Distinctions between formal and informal learning are no longer valid as society turns itself entirely to the power of the machine.

But which one of these scenarios turns out to be closest to our actual future depends on the decisions we make now. I for one am a strong believer in the importance of the physical school as a place of human community connection where the joy of learning is experienced in the company of others.

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So, in conclusion, let's make our classrooms places where students experience the interior and lasting joy of learning, regardless of whether we are having fun or whether that learning is "relevant."

I hope too that teachers will also find some joy in teaching this new curriculum, particularly when it comes to Technologies and Digital Literacy.

A national curriculum ensures the same high standard of curriculum content and expectation of learning is available to every student, regardless of where they live. It reflects the priorities and expectations we hold for our young people, and the updated Australian Curriculum, Version 9.0 is one that sets high standards.

But the curriculum is just the scaffolding that holds together the learning. The real innovation begins with people and we need to develop those digital literacy skills that will help shape the innovators of tomorrow – and that is what we hope the new Curriculum will help teachers to do.

