

# Queensland response to the draft F–10 Australian Curriculum: Technologies

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**Queensland Studies Authority**

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# 1. Introduction

The Queensland Studies Authority (QSA), in partnership with Education Queensland (EQ), Queensland Catholic Education Commission (QCEC) and Independent Schools Queensland (ISQ), appreciates the opportunity to provide feedback on the draft *F–10 Australian Curriculum: Technologies*. Queensland supports the development of an Australian Curriculum that will provide consistent and explicit curriculum expectations across the nation.

This response provides a summary of the collated Queensland feedback from:

- representative curriculum and learning area committees of the QSA
- representatives of the Queensland Society for Information Technology in Education (QSITE) QSITE
- representatives of the Home Economics Institute of Australia (Qld)
- representatives from The University of Queensland and Queensland University of Technology
- representatives of the three school sectors, representing and advocating for 1400 EQ schools, 292 Catholic schools and 188 Independent schools.

Queensland's consultation identified strengths, issues and concerns for the Australian Curriculum, Assessment and Reporting Authority's (ACARA) consideration when redrafting the *F–10 Australian Curriculum: Technologies*.

The Queensland response is organised in the following way:

- key strengths of the draft curriculum and broad issues and concerns, with suggested ways forward
- specific feedback on each section of the draft curriculum, with subject-specific issues and concerns and suggested ways forward.

## 2. Key strengths, issues and concerns

### 2.1 Strengths

Consultation participants identified the following key strengths.

- The Technologies learning area has the potential for students to engage in creative thinking and to use their hands to design and make products.
- Participants viewed positively the intent of the curriculum to be futures focused.
- The organisation of the content strands is aligned with other Australian Curriculum learning areas and subjects, while remaining true to Technologies.
- Participants were able to see potential links between other learning areas and the Technologies learning area.
- The content of Design and technologies, overall, is what is expected in a design and technologies curriculum.
- The Digital technologies curriculum, along with the Information and communication technology (ICT) general capability, should make expectations clear to teachers.
- The algorithmic, step-by-step, methodological approach in Digital technologies is rigorous.
- The structure of the achievement standards is consistent with other learning areas and reflects the Technologies content descriptions well.
- Generally, participants considered the glossary to be clear and concise.

### 2.2 Issues and concerns

Consultation participants raised the following key issues and concerns.

- The Design and technologies content descriptions are overly long, with multiple ideas, processes and content within a single description, making it difficult to understand what is intended to be taught.
- The Digital technologies content descriptions specify a level of technical knowledge and skills that represents a significant increase in expectations for students and non-specialist teachers from current practice. They are too demanding for the year levels at which they are pitched, particularly from Foundation to Year 6.
- Two of the three Queensland school sectors stated that it would be difficult to support the release of the curriculum should the content descriptions for Design and technologies and Digital technologies not be revised to address the issues stated in the preceding two points.
- Participants were concerned about the volume of material to be covered across the two areas of Design and technologies and Digital technologies. The number and size of the content descriptions will be difficult to achieve within the indicative times.
- There seems to be more opportunity for the development of creative solutions within Design and technologies than within Digital technologies.
- The language used in the curriculum, in general, is not user friendly for teachers. The document is very long, difficult to read and has too much jargon.
- The organisation of the curriculum is unclear due to its numerous elements.

- The separate rationales and aims for the Technologies learning area and the two subjects, Design and technologies and Digital technologies, serve no useful purpose and confuse the curriculum.
- The draft Technologies curriculum does not make clear the design process. This is essential given that the learning area also has a focus on project management. Both subjects need to outline the same design process, which should be shown in a single diagram. This should then be elaborated as the subject-specific processes and skills.
- The importance of practical performance is not emphasised. Consultation participants were concerned that the importance of “making” in Technologies is lost in the curriculum. The Technologies subjects are practically oriented and this needs to be clear. Overall, ideation and creativity are lacking in the content. This is an essential part of successful design in Creating preferred futures.

## *Design and technologies*

- The Design and technologies content descriptions were the subject of significant criticism. They are wordy, with multiple ideas, processes and content within a single description. Their style is completely at odds with the content descriptions in the other learning areas and, to a lesser extent, the content descriptions in Digital technologies. Many of the content descriptions read as aspirational statements, rather than content descriptions that outline what should be taught and what students should know and be able to do.
- Students are frequently asked to critique and evaluate designs but the curriculum does not explicitly ask them to create or make. The content descriptions do not make clear that learning in Technologies is explicitly hands on. The actual “doing” or “making” component of production in the design process is not emphasised strongly enough. It is represented in only one content description per band.
- In Years 9 and 10, the Design and technologies contexts — Food and fibre production, Engineering principles and systems, and Food technologies — do not have content descriptions. This implies a lack of importance for these contexts and does not adequately support schools to design suitably rigorous curriculum in Years 9 and 10. All other optional subjects are specified with content descriptions for the full sequence of Foundation to Year 10.
- The Implementing the curriculum section in Design and technologies has the statement:
 

By the end of each band students will have had the opportunity to design, produce and evaluate designed solutions for each of the identified Technologies contexts. To provide breadth of study, students should complete at least one product design project, one service design project and one environment design project, within each band. The combination of contexts and types of solutions is a school decision (p. 30).

This is of significant concern for Queensland. States and territories are responsible for assessment and ACARA writes curriculum (content descriptions and achievement standards). The curriculum should not mandate pedagogy or specific projects or learning activities.

## Digital technologies

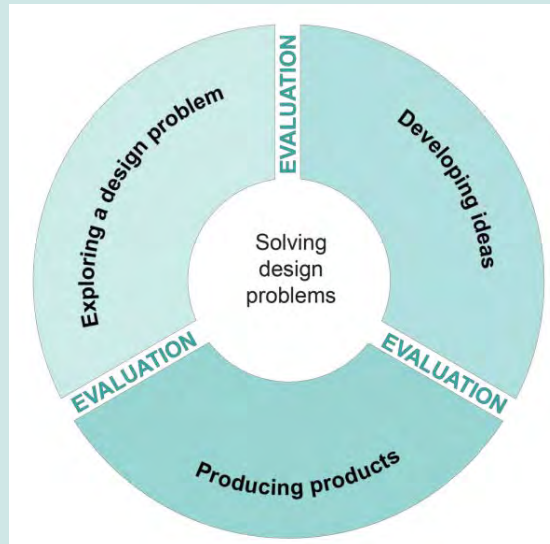
- The content descriptions are generally too demanding for the year levels at which they are pitched — up to two years above what is age appropriate. This is exacerbated by the use of complex and discipline-specific language in the content descriptions. It suggests a scope and sequence that is pitched at a level beyond what is reasonable to expect of a typical student at that age.
- The content is too heavily program based and overly technical, especially in the primary years. The use of digital technologies to design solutions is not balanced with an end-user approach.
- The elaborations have very specific technical content that is often not developmentally appropriate, particularly in the earlier years of the curriculum.
- Feedback stated that the Digital technologies subject seems to be “locked inside the computer”. That is, much of the specific content is related to desktop computing and does not obviously link to other computing, such as smartphones and other specialised computing devices.
- Access for all students will be an issue — schools do not have all of the resources that they will need. Access to computers and other technologies is still an issue for many schools.
- Some feedback suggested that the sequence of learning is not adequately specified in the content descriptions for each band. It does not provide the “stepping stones” for the development of skills from Foundation to Year 10.
- Non-specialist primary teachers will find that the degree of specialised technical knowledge and skills required is an area of concern, and will require significant professional development.

### Way forward

- Revise the curriculum, using plain language and removing duplication.
- Use diagrams to explain various relationships, for example:
  - how all the components (capabilities, subjects, strands, contexts etc.) come together
  - the relationships between technologies processes and design processes.
- Merge the elements of the Technologies learning area rationale and aims into the rationale and aims for each subject. Provide only one rationale and aims for each subject by beginning with:
  - an overarching Technologies statement, then progressing to subject-specific statements
  - overarching Technologies aims, then progressing to subject-specific points.
- Outline a common design process for the Technologies learning area. For example:
  - Identifying needs, wants and opportunities
  - Defining a design task
  - Exploring ideas
  - Developing ideas
  - Selecting solutions
  - Using resources to produce an outcome
  - Evaluating the outcome.



- Expand upon the common design process with a diagram. For example:



[www.qsa.qld.edu.au/downloads/senior/snr\\_tech\\_studies\\_2013\\_syll.pdf](http://www.qsa.qld.edu.au/downloads/senior/snr_tech_studies_2013_syll.pdf)

- Emphasise the importance of practical performance and making in the curriculum.

### Design and technologies

- Rewrite the content descriptions for Design and technologies to:
  - be shorter and sharper. Each content description should focus on fewer ideas, processes and content in order to make clear what students should know and be able to do
  - place greater emphasis on the hands-on, “doing” and “making” components of production in the design process. Include in the content elaborations additional detail about the expectations for practical and manipulative skills in the Technologies contexts.
- Rewrite or delete the Implementing the curriculum section in Design and technologies. If rewritten, consider rewording it to:
 

“By the end of each band, students will have had the opportunity to design, produce and evaluate designed solutions for each of the identified Technologies contexts. To provide breadth of study, Design and technologies has been designed to accommodate, if appropriate, one product design project, one service design project and one environment design project within each band. The combination of contexts and types of solutions is a school decision. States and territories will determine whether there are any requirements related to these projects as part of their implementation advice.”
- Write Design and technologies content descriptions for all of the contexts in Years 9 and 10. Clearly identify that, for these year levels, state and territory school authorities will:
  - decide whether students can choose to continue in one or both subjects and/or
  - use the relevant content descriptions and achievement standards provided in the Australian Curriculum as a basis for developing state or territory subjects.

### Digital technologies

- Further refine the content descriptions for Digital technologies to:
  - minimise the use of technical language and jargon
  - ensure that they are broad enough to avoid narrowing the opportunities for teachers and students to be creative in Digital technologies.
- Re-evaluate the pitch of the Digital technologies content descriptions. They are currently set too high.
- Reconsider the appropriateness of Digital technologies content descriptions, particularly in Foundation to Year 6.

## 3. Section-by-section analysis

### 3.1 The rationales and aims

#### *Strengths*

Consultation participants identified the following strengths in the rationales and aims.

- The rationales reflect the intent of the *Melbourne Declaration on Educational Goals for Young Australians* (2008) and generally meet expectations for the learning area and subjects.
- The rationales recognise the relationships between technologies and people.
- The rationales identify important aspects of learning in Technologies, such as the design process and critiquing.
- The overarching intent of the rationales succinctly brings together important connections for progressive thinking in a Technologies curriculum.
- The rationales and aims identify the importance of technologies in both study and work, and outline the intent to deliver a forward-thinking curriculum for Technologies.
- The rationale for Design and technologies identifies the management of the subject through students' completion of independent and collaborative projects. This intent should allow for a practical, hands-on approach.
- The rationale for Design and technologies gives a good description of the subject as comprising traditional, contemporary and emerging technologies.
- The rationale for Digital technologies promotes computational thinking.

#### *Issues and concerns*

Consultation participants identified the following issues and concerns about the rationales and aims.

- The purpose of three sets of rationales and aims — a rationale and aims for the learning area and separate rationales and aims for each of the two subject — is not clear. When presented online or in printed form, this leads to a disjointed reading of the curriculum.
- The rationale does not explain the nature of technologies. It assumes the reader already understands what is meant by “technologies”.
- Some feedback stated that the nature and importance of the Technologies learning area, as well as the curriculum intent, is not clear, and the rationale is too generic and only identifies some key terms and ideas (such as sustainability).
- “Create” and “creating” are used in the aims but are not emphasised in the rationale. That is, the rationale does not sufficiently emphasise creating, making and the creative processes.
- The second paragraph of the Technologies learning area rationale includes the sentence: “The ubiquity of digital technologies provides new ways of thinking, collaborating and communicating for people of all ages and abilities”. This appears to give the Technologies learning area rationale an explicit focus on Digital technologies and not Design and technologies.

- Some aims are repetitive and not sufficiently distinct from one another. For example, aims 3 and 4 of the Technologies learning area include, respectively: “evaluate technologies processes to ... create solutions” and “... create, produce and evaluate technologies solutions”.
- Feedback also stated that:
  - the importance of practical performance is not emphasised enough, particularly in Design and technologies
  - the rationales do not sufficiently capture how Systems thinking and Project management are valuable in contributing to the development of creativity, innovation and the development of technologies
  - technologies processes need to be better articulated in the rationales
  - some of the aims for the Technologies learning area are too long and wordy.

#### Way forward

- Write separate aims and rationales for the two subjects only. The first paragraph of each rationale should be about the Technologies learning area and lead in to the subject-specific rationale. The aims for each subject should begin with generic Technologies learning area aims and lead into specific aims that distinguish between the two subjects.
- Further explain the nature of technologies in the rationales, using the definition in the glossary as a starting point.
- Further refine the rationales to identify what the purpose of each subject is. Make clear the similarities of, and the differences between, the two subjects. For example, Design and technologies, compared to Digital technologies, is about creating and manufacturing physical products.
- Strengthen the emphasis on creating, making, creative processes and practical skills in the rationales, with the aim of balancing cognitive technology processes with making/producing technology processes.
- Continue to refine the aims to be clear, succinct and without repetition.

## 3.2 Organisation of the Technologies learning area

### Strengths

Consultation participants identified the following strengths in the organisation of the Technologies learning area.

- Participants viewed the strands — Knowledge and understanding, and Processes and production skills — positively. They are equivalent to the strands of other Australian Curriculum learning areas.
- Table 1: “Design and technologies and Digital technologies content structure”, Table 2: “Design and technologies content structure” and Table 4: “Digital technologies content structure” all received positive feedback.
- Feedback was broadly supportive of the key ideas.
- Participants viewed the Project management key idea positively and supported the application and use of technologies in a variety of contexts.

## Issues and concerns

Consultation participants identified the following issues and concerns about the organisation of the Technologies learning area.

- The nomenclature and curriculum taxonomy used in the Technologies learning area is inconsistent with other Australian Curriculum learning areas, and terminology is used imprecisely.
  - The content structure states that the curriculum taxonomy uses strands, within which are key concepts and processes, as outlined in Tables 1, 2 and 4. Those listed under Knowledge and understanding, such as “the use, development and impact of technologies in people’s lives”, are not concepts or processes.

Further, this taxonomy is inconsistent with many other Australian Curriculum learning areas, which organise the curriculum into strands and sub-strands.
  - The bullet points in Tables 1, 2 and 4 are related to the organisation of the scope and sequences for the subjects. However, because they do not use the exact wording as used in the headings of the scope and sequence, this is not as immediately obvious as it is in the other learning areas.
  - The Key ideas of the Technologies learning area section is confused and contradicts other learning areas:
    - Key ideas are used in Health and Physical Education (HPE) to organise the content descriptions, whereas in Technologies the intent appears for them to be embedded in the content.
    - One of the key ideas, Creating preferred futures, is also an overarching idea.
    - With respect to how these ideas have been used in the curriculum, they are more like overarching ideas, as in the F–10 Australian Curriculum: Science.
- Feedback emphasised the importance of ensuring that the Technologies processes and production skills are consistent with the other learning areas that have Skills strands, such as Science and History. For example, “evaluate” should be consistent across these learning areas.
- While consultation participants supported the idea of Systems thinking and Creating preferred futures, they felt that these need to be further strengthened in the rationales, aims and content descriptions.
- A clearly stated explanation of Systems thinking and Creating preferred futures is needed. The first sentence of this section, “The Technologies curriculum focuses on systems thinking to develop the technologies knowledge, understanding and skills to provide a method for identifying and moving towards ethical, socially responsible and sustainable patterns of living”, was singled out for criticism. Feedback stated that it is not a meaningful statement.
- The Design and technologies processes and production skills strand is further classified into three sub-strands:
  - Critiquing, exploring and investigating
  - Generating, developing and evaluating ideas
  - Planning, producing and evaluating designed solutions.

These sub-strands are too broad and their content descriptions are overwritten. They try to cover too many processes in one content description. The equivalent Skills strands in

other Australian Curriculum learning areas, such as Science and History, are classified into more sub-strands and their content descriptions are succinct and to the point.

The taxonomy of Processes and production skills also include elements that overlap — insufficient demarcation between these elements adds to the lack of clarity of the associated content descriptions.

- Consultation participants viewed the Project management key idea positively. However, they felt that it is not fully developed and needs to be embedded more effectively throughout the curriculum, including the rationale, aims and the Process and production skills strand.

### Way forward

- Use the same taxonomy in the content structure as is other learning areas, that is, strands and sub-strands. Condense the bullet points in Tables 1, 2 and 4 to a similar length as sub-strands in other learning areas and organise them in the same way as the content descriptions.

The scope and sequences for both subjects do this and should be used as the sub-strands. For example, in Design and technologies Knowledge and understanding:

- “the use, development and impact of technologies in people’s lives” would become “Technologies and society”
- “design concepts across a range of technologies contexts” would become
  - Materials and technologies specialisations
  - Food and fibre production
  - Engineering principles and systems
  - Food technologies.
- Strengthen alignment throughout the curriculum, from the rationales and aims to the organisation of the content descriptions and achievement standards.
- Refer to Systems thinking and Creating preferred futures as “overarching ideas” only, not as key ideas. Key ideas would be explicitly taught. The overarching ideas in the Technologies learning area should be explained in the same way as the overarching ideas in the Australian Curriculum: Science or the concepts in History and Geography. For example:

“The Technologies curriculum uses two overarching ideas that support coherence and developmental learning within and across year levels. The overarching ideas frame the development of concepts in the Technologies Knowledge and understanding strands, support key aspects of the Technologies Processes and productions skills, and contribute to developing students’ appreciation of the purpose and impact of technologies in societies.”
- Further explain both Systems thinking and Creating preferred futures.
- While Systems thinking, Creating preferred futures and Project management are mentioned in the rationales and aims, these links should be more explicit. For example, refer explicitly to project management in the second aim of Design and technologies and the first aim of Digital technologies.
- Divide the Design and technologies processes and production skills into four or five sub-strands, based on a clearly identified design process, in order to write more succinct content descriptions that are clear, to the point and follow the design process. For example:
  - Identifying and defining
  - Exploring and developing
  - Producing and making
  - Evaluating and communicating.

- If three sub-strands in Processes and productions skills remain, provide a clearer distinction between them and clearly follow a design process, such as:
  - Exploring a design problem
  - Developing ideas
  - Producing designed solutions.
 Or
  - Investigating and designing
  - Producing and creating
  - Analysing and evaluating.
- In all the areas mentioned above, emphasise that evaluation occurs throughout the design process (see the example diagram on page 5 of this report.)

### 3.3 Technologies across Foundation to Year 10

Consultation participants raised the following points about the Technologies learning area, Design and technologies, and Digital technologies across Foundation to Year 10 sections.

- Participants strongly supported the statement “The Australian Curriculum: Technologies is based on the principle that all young Australians are entitled to engage fully in a range of technologies and to be given a balanced and substantial foundation in the knowledge and skills base of each subject” (page 8).
- The developmental nature of learning, as outlined in the phase descriptions, is clear. For example:
  - Foundation to Year 2: “ ... to learn through purposeful and directed play to develop attitudes of care in relation to the places and resources they use.”
  - Years 3 to 6: “ ... recognise, appreciate and value the different ways in which others think and respond to problems and situations, including those with a regional perspective.”
  - Years 7 to 10: “ ... specialised problem-solving activities will be sophisticated, acknowledge the complexities of contemporary life and may make connections to related specialised occupations and further study.”
- Participants gave favourable feedback on:
  - the band descriptions for each subject area
  - the affirmation of play as a suitable approach to technologies learning within the Early Years bands.
- The Foundation to Year 2 phase description, which includes the statement “ ... creating ideas and information and sharing them online with known people” is not age appropriate and should be moved into the next phase.
- Some sentences within the band descriptions are overly long. For example, from Years 3 and 4 Design and technologies: “Students learn to harness their creative ideas and imaginative approaches to achieve designed products, services and environments through planning and awareness of the properties and characteristics of materials and the use of tools and equipment.” Refine the band descriptions using more succinct sentences.

## 3.4 Content descriptions

### Strengths

Consultation participants identified the following strengths in the content descriptions.

- Overall, the development from Foundation to Year 10 is logical.
- It is clear that the content descriptions are intended to be of a high standard.
- The content of Design and technologies is as would be expected.
- The Digital technologies content descriptions are generally well written and provide a clear expectation of what students should be taught.
- The Digital technologies sub-strand Creating and interacting online shows good development.
- Participants viewed the inclusion of robotics in the younger years favourably.
- It is possible to see alignment with other learning areas.
- A clear link from the band descriptions to the content descriptions and achievement standards is evident.

### Issues and concerns

Consultation participants identified the following issues and concerns about the content descriptions.

#### Design and technologies

- Three significant issues and concerns were repeatedly the focus in consultations on the Design and technologies content descriptions:

1. The content descriptions are overly wordy and are overwritten, with multiple ideas, processes and content within a single description. For example:

- 6.4 “Explain how forces or electrical energy can be used to control movement, sound or light in a product or system and consider how material properties and construction processes influence the design and construction of structures.”

This description is made up of multiple understandings and processes and, as a consequence, the intent is not clear.

The content descriptions in other learning areas are more succinct and to the point. Consider the wordiest Year 6 content descriptions from the Australian Curriculum: Mathematics and Science respectively:

- Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
- Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (AC SIS107)

These are long sentences. However, they are straightforward statements that focus on one main idea and make clear what should be taught to all students.

2. The content descriptions are not explicit enough in asking students to ideate or make and develop manipulative skills. They do not make explicit enough that students should be doing hands-on work. Some feedback suggested that this subject could be entirely theoretical.
  3. In Years 9 and 10, the Food and fibre production, Engineering principles and systems and Food technologies contexts do not have content descriptions. This implies that these contexts are not valued, and does not adequately support schools to design suitably rigorous curriculum in Years 9 and 10. All other optional subjects are specified with content descriptions for the full sequence from Foundation to Year 10.
- Alignment between what is valued in the rationale and aims is not followed through in the content and standards.
  - Design and technologies does not focus enough on drawing and graphical representation.

### *Digital technologies*

- The content descriptions are generally pitched too high — two years above what is age appropriate. The use of complex and technical language in the content descriptions suggests a scope and sequence that is pitched at a level that is well beyond the developmental capability of a typical student, for example “user input and branching” may be too complex for Year 3.
- Expert knowledge will be required to provide advice on the use of appropriate resources, such as selecting software applications for younger students. Examples include:
  - 4.3 “ ... using simple ... databases and other software to create information and solve problems”
  - 4.4 “use a range of digital systems and peripherals ... ”
  - 4.6 and 6.7 “visual programs”.
- The content is too heavily program based and overly technical, especially in the mandatory years of the curriculum (Foundation to Year 8). This is potentially an issue for non-specialist teachers who are delivering the curriculum. For example, the introduction to general purpose programming languages in Year 7.
- The focus on programming is not balanced with an end-user and use of digital technologies approach.
- Some content descriptions are too prescriptive in terms of the program languages and contexts suggested for use. This will limit the current practice of innovative Digital technologies teachers. Visual programming languages need to be a part of the curriculum the whole way through.
- Some content descriptions do not reflect essential knowledge and skills for 21st century learners. For example: “8.1 Explain how raw text, image and audio data are represented in binary”. Consultation participants frequently criticised the emphasis on binary, and this content description in particular, as being unnecessary and uninteresting.
- The Representation of data content descriptions from Foundation to Year 4 (2.1 and 4.1 respectively) are more appropriate than those from Year 5 to Year 10 (6.1, 8.1 and 10.1 respectively), which are too narrow.
- Consultation participants were concerned that the content in Digital technologies is “old-fashioned” and lacks currency and links to current industry. Much of the specific content is related to desktop computing and does not obviously link to other computing, such as smartphones and other specialised computing devices. This could be detrimental to student engagement.



## Way forward

### Design and technologies

- Rewrite the content descriptions for Design and technologies to:
  - be shorter and sharper. Each content description should focus on fewer ideas, processes and content in order to make clear what students should know and be able to do
  - place greater emphasis on the hands-on, “doing” and “making” component of production in the design process.
- Write Design and technologies content descriptions for all the contexts in Years 9 and 10. Clearly identify that, for these year levels, state and territory school authorities will:
  - decide whether students can choose to continue in one or both subjects and/or
  - use the relevant content descriptions and achievement standards provided in the Australian Curriculum as a basis for developing state or territory subjects.

### Digital technologies

- Further refine the content descriptions for Digital technologies to:
  - minimise the use of technical language and jargon
  - ensure that they are broad enough to avoid narrowing the opportunities for teachers and students to be creative in Digital technologies
  - provide a better balance of computer science concepts with the other aspects identified in the Digital technologies rationale
  - provide a balance of fundamental programming understandings and skills with the inventive use of digital technologies to solve authentic real-world problems
  - include opportunities for connecting learning to innovation, reasoning, problem-solving, ideation processes and open-ended abstract thinking during the study of Digital technologies.
- Re-evaluate the pitch of the Digital technologies content descriptions. They are currently set too high.
- Reconsider the appropriateness of the Digital technologies content descriptions, particularly in Foundation to Year 8. Remove reference to “binary” in the content descriptions.
- Ensure that the mandatory years of the Digital technologies curriculum is focused on building students’ enthusiasm. In Years 9 and 10, provide an accelerated curriculum that allows students who have chosen to continue their study of Digital technologies, to learn high level concepts and programming skills.

## 3.5 Content elaborations

Consultation participants identified the following points about the content elaborations.

- Some content elaborations, especially in Digital technologies, provide a clear and succinct activity or scenario that should aid in unpacking the content description, for example the elaboration for content description 2.3 in Digital technologies: “using digital systems to collect data for a purpose, for example using a mobile device to record a musical performance”.
- Consultation participants viewed positively examples of engaging programming in Digital technologies, such as robotics.
- The elaborations chosen for each subject do not make reference to the elaborations in the other subject. Nor do they highlight the connections of the two subject areas to the overall rationale, aims and key ideas of the Technologies learning area. Connections between the two Technologies subjects should be made. For example, provide elaborations to demonstrate how Digital technologies might be connected to Design and technologies projects.

- Some elaborations, in both subjects, are unclear, for example the elaboration for content description 2.2 in Digital technologies: “noticing ergonomics when children are playing with, exploring and experimenting with information systems, for example when using touch screen devices in different settings, such as outdoors or when playing a game on the floor”. This sentence has multiple verbs, examples and scenarios. Revise the content elaborations to ensure that they are clear and succinct, and that each one describes only one activity or scenario.
- Some of the elaborations are not age appropriate. For example, in Foundation to Year 2, “learning about how data are represented by changing a colour digital photograph to black and white and noting the change in file size”.
- Include in the content elaborations for Design and technologies additional detail about expectations for practical and manipulative skills in the contexts, as well as more emphasis on drawing and graphical representation.
- The Design and technologies elaborations need to provide clear links to relevant contexts in other learning areas such as HPE. This is especially important for subjects such as Home Economics.
- The Digital technologies elaborations ignore a whole range of technologies that students use and are interested in. For example, apps, claymation, expert systems and mobile games. Revise the elaborations to include more relevant learning for students.
- As with the content descriptions, some elaborations are not age appropriate. Feedback stated that visual (object-oriented) languages like Alice or Scratch should be the basis for programming applications in all years.

## 3.6 Achievement standards

Consultation participants identified the following points about the achievement standards.

- The achievement standards are consistent with other learning areas and are generally aligned to the band descriptions and content. Participants viewed this positively. The standards are more clearly written than the content descriptions. Based on the model of the achievement standards used in the other Australian Curriculum learning areas, the achievement standards are appropriate and aligned to the content and the band descriptions.
- The achievement standards have a good emphasis on making things and using materials, tools and equipment. Participants viewed this positively.
- Some very specific content in the achievement standards is not in the content descriptions. A teacher could teach all of the content descriptions and yet their students will not have learned the required understandings and skills to demonstrate these aspects of the achievement standards.

For example, the Years 3 and 4 Design and technologies achievement standard states: “... including making scaled models and annotating drawings”. The Years 3 and 4 content descriptions do not refer to either of these. (The band description does, and there is some reference in the elaborations. However, it is the content descriptions that are taught.)

Continue to refine the achievement standards to ensure that they describe the typical extent of knowledge, depth of understanding, and sophistication of skills at the end of each band of content descriptions.

- Aspects of the achievement standards are aligned to Technologies and society (in Design and technologies) and Issues and impacts (in Digital technologies), and are related to the scope of students' understanding of their environment. This develops across Foundation to Year 10, from students' personal environment to their understanding of complex global issues. Ensure this developmental sequence completely aligns with similar aspects of other learning areas, such as Science as a Human Endeavour in the Australian Curriculum: Science.
- The following sentences in the Years 9 and 10 achievement standards are too high level and not something that a typical student would be able to demonstrate:
  - Design and technologies: “ ... students explain the complex interdependencies involved in the global environment in the development of technologies, products, services and environments for preferred futures.”
  - Digital technologies: “ ... in creating digital solutions that create enterprising opportunities and transform lives and societies.”
 Revise these to be more realistic.
- Remove reference to normative language such as “increasingly sophisticated” from the achievement standards (and content descriptions).

### 3.7 General capabilities and cross-curriculum priorities

Consultation participants raised the following points about the general capabilities and cross-curriculum priorities.

- The descriptions of how the general capabilities and cross-curriculum priorities apply to the Technologies curriculum were all generally supported in Queensland's feedback.
- Further emphasise the difference between the Digital technologies subject and the ICT general capability. Refine this section by providing a succinct statement at the beginning that outlines the key differences, before elaborating further.
- Participants gave positive feedback on the specific Technologies examples provided for the Literacy and Numeracy capabilities.
- Personal and social capability, Ethical understanding and Intercultural understanding need to be further refined, using plain language.
- Aboriginal and Torres Strait Islander histories and cultures and Asia and Australia's engagement with Asia need more specific examples.
- Sustainability provides some good examples.

### 3.8 Links to other learning areas

Consultation participants raised the following points about the Links to other learning areas section.

- Economics and Business should be included in this section. Business is one of the highest users of digital technologies, and innovation in technologies is a fundamental part of modern economies.
- Other subjects that are traditionally taught in schools, such as Home Economics, should be mentioned in the curriculum.

- The word “simple” is used in the links to Mathematics and Science. This is unnecessary — from Foundation to Year 10, opportunities are available for work that goes beyond simple.
- Some feedback suggested that the Technologies learning area does not align with the Australian Curriculum: Mathematics in terms of the year level in which some concepts are introduced. For example, the content descriptions need to show clear alignment to the Australian Curriculum: Mathematics with respect to algebraic and algorithmic facility.
- Strengthen and identify further links and alignment to other learning areas, particularly Mathematics and Science.

## 3.9 Glossary

Consultation participants raised the following points about the glossary.

- The term “simple” is used frequently in the curriculum and is not defined. Provide glossary entries for “simple” and “complex”, and ensure they are consistent with their use in other learning areas and subjects. Consider:
  - Simple: involving few elements, components or steps; obvious data, information or outcomes
  - Complex: involving a number of elements, components or steps.
- The entry for “Technologies contexts” is misleading. It does not apply to Digital technologies. Revise this entry to be “Contexts (Design and technologies)”.
- Food and fibre production should be further refined — the explanation uses the same words as the phrase being explained.
- Other terms that should be included in the glossary:
  - Engineering principles and systems
  - Food processing and food preparation (ensuring the difference is clear)
  - Food technologies
  - Smart materials.



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