

**The Australian Council for Computers in Education, Draft
Curriculum Technologies - Response Summary.
April 18th 2013.**



The Australian Council for Computers in Education (ACCE) acknowledges the significant achievement that a developmental Digital Technologies curriculum from F-10 is for education in Australia.

ACCE also recognises the significant implementation issues that will emerge from the introduction of a new subject into the Australian Curriculum and commits to supporting this implementation. As an initial step ACCE has allocated \$30,000 towards small grants for states and territories to help explore the issues and challenges around the implementation.

The Council response to the consultation is below. Please note the council chose not to respond to all 153 survey questions.

I encourage others to respond to the consultation using the council responses if required.

Tony Brandenburg
President and Fellow (ACCE)

TECHNOLOGIES

Rationale

9. *The Rationale for the draft Digital Technologies curriculum is clear about the nature and importance of the Digital Technologies for all Australian students.*

9.1 ACCE is concerned that the rationale is somewhat generic and does not effectively reflect the significant changes and challenges that the introduction of Digital Technologies presents.

9.2 ACCE recommends strengthening statements to reflect the import of study of Digital Technologies to student futures, the Australian economy, and student engagement with Digital Technologies and further study and career opportunities.

9.3 ACCE recommends that the rationale more directly reflect a rationale for why the subject is being introduced and why it is no longer expressed as a subsection of the Technology KLA.

Aims

10. *The Aims of the draft Digital Technologies curriculum clearly state the intended learning in the subject.*

10.1 ACCE recommends that there be clearer linkage of the Technologies aims to the aims of Digital Technologies.

10.2 ACCE recommends the inclusion of aspirational aims to reflect a strengthened rationale on the import of Digital Technologies.

Organisation of the Technologies Learning Area

11. *The organisation of the learning area provides a coherent view of the key components and features of the technologies curriculum.*

11.1 ACCE is in general agreement that the organisation provides a view of the key components and features of the technologies curriculum.

Content structure

12. The content structure for the learning area is appropriate.

12.1 ACCE commends the establishment of a developmental curriculum for Digital Technologies from F to 10 and the significant influence this will have on student learning and the Australian economy and society.

12.2 ACCE recommends that 'Processes and production skills' be modified to 'Processes' as 'production skills' implies the development of tangible solutions to problems. While this effectively reflects all of the processes in Design and Technologies, it does not reflect the majority of processes described for Digital Technologies.

13. The common strand structure for Design and Technologies and Digital Technologies is appropriate for organising the curriculum content.

13.1 While necessary, the current Key Ideas do not effectively provide opportunities to integrate learning between Digital Technologies and Design and Technology.

14. The key idea of systems thinking is appropriate for this learning area.

14.1 ACCE recommends that Systems Thinking be clarified with respect to how Design Thinking and Computational Thinking both emerge from this overarching framework and in particular, how Design Processes support this framework without being the exclusive focus of D&T or DT. i.e. Design Processes that are the focus of D&T Processes and production skills also need to be developed in DT with regards to project based learning approaches.

15. The key idea of creating preferred futures is appropriate for this learning area.

15.1 ACCE commends a focus on creating preferred futures but would strongly support this being expanded from a focus on sustainability to include the many other aspects that such a focus can support e.g. Futures Thinking and exploring the opportunities that Digital Technologies can support.

16. The key idea of project management is appropriate for this learning area.

16.1 ACCE strongly supports a focus on project management but recommends that this be much more strongly reflected in the curriculum as it is considered that this is currently weakly addressed.

Technologies across Foundation to Year 10

17. The description of learning in Technologies across stages of schooling is pitched appropriately to the age group.

17.1 ACCE is generally supportive of the content descriptions and their levels.

Achievement standards

18. The explanation of the nature of achievement standards in Technologies is clear.

18.1 ACCE is supportive of the achievement standard statements as appropriate descriptions of the content to be addressed for the bands.

Diversity of learners

19. The explanation of the ways in which the Australian Curriculum caters for the diversity of learners is clear.

19.1 ACCE is concerned that no consideration is made of students progressing more or less quickly with respect to Year level bands is not addressed.

19.2 ACCE recommends that acknowledgment be made that many Technologies learning activities will permit students to demonstrate achievement at higher levels and that this should be stated.

Links to other learning areas

30. The links between Technologies and other learning areas are appropriate.

30.1 ACCE is supportive of the links described between Technologies and other learning areas.

Implications for implementation

31. The ways in which teachers can implement the Technologies curriculum to support student learning are clear.

31.1 ACCE is concerned that while the Design and Technologies subject has a very clear process for supporting student learning, the Digital Technologies subject is significantly less clear.

DIGITAL TECHNOLOGIES

Rationale

45. The Rationale for the draft Digital Technologies curriculum is clear about the nature and importance of the Digital Technologies for all Australian students.

45.1 ACCE is concerned that the rationale does not fully reflect the significant changes and challenges that the introduction of Digital Technologies presents.

45.2 ACCE recommends strengthening statements to reflect the import of study into Digital Technologies to student futures, the Australian economy, and student engagement with Digital Technologies for further study and career opportunities.

45.3 ACCE recommends that the rationale more directly reflect the rationale for why the subject is being introduced, why significant concepts are included, e.g. programming, abstraction, online interactions, and why it is no longer expressed as a subsection of the Technology KLA.

45.4 ACCE notes that the ACARA February 2013 edition information sheet provides a more digestible rationale for a teacher audience for why the Digital technology subject is being implemented than the rationale statement included in the draft.

Aims

46. The Aims of the draft Digital Technologies curriculum clearly state the intended learning in the subject.

46.1 ACCE recommends that there be clearer linkage of aims to the content structure, key concepts, and strands.

46.2 ACCE recommends the inclusion of aspirational aims to reflect a strengthened rationale on the import of Digital Technologies.

46.3 ACCE recommends that the Digital Technologies aims have more direct reflection into the overarching aims of Technologies.

Organisation

Content structure

47. The nature of the two strands and their relationship is clearly recognisable in the draft Australian Curriculum: Digital Technologies.

47.1 ACCE commends the establishment of a developmental curriculum for Digital Technologies from F to 10 and the significant influence this will have on student learning and the Australian economy and society.

47.2 ACCE recommends that 'Processes and production skills' be modified to 'Processes' as 'production skills' implies the development of tangible solutions to problems. While this effectively reflects all of the processes in Design and Technologies, it does not reflect the majority of processes described for Digital Technologies.

47.3 ACCE is concerned that the Digital Technologies section does not relate to the overarching Key Ideas of the Technologies curriculum.

47.4 ACCE recommends that the Key Idea of Systems Thinking be used to link Computational Thinking with the Design Processes that can permit effective project based learning approaches.

47.5 ACCE recommends that the Key Idea of Creating Preferred Futures be expanded in the Digital Technologies subject beyond a sustainability focus to include other aspects of futures thinking and framing learning towards innovation and exploration of new technologies.

47.6 ACCE recommends that the Key Idea of Project Management concepts and processes be more explicitly included in project based learning approaches in Digital Technologies.

47.7 ACCE is concerned that the framing of knowledge and understanding and processes and production skills in DT do not relate well to the framing of the same in the D&T subject.

47.8 ACCE is concerned that DT processes and production skills do not explicitly reflect a design process (similar to that effectively detailed in the D&T processes and production skills).

47.9 ACCE recommends that the Computational Thinking framework be one aspect of DT processes and production skills but that a design process framework is included to accommodate design processes, while retaining the flexibility to incorporate specific skills and concept develop using non project based (e.g design challenge/design process) processes.

Key concepts

101. The key concepts provide a useful organisational element in the draft curriculum

101.1 While supportive of the inclusion of Computational Thinking, ACCE is concerned that all aspects of Digital Technologies are being framed by a single, specific model - Computational Thinking. As this model was developed from Computer Science without consideration of other aspects of computing, i.e. software engineering, information systems development, computer systems analysis, digital/multimedia development, etc. it has resulted in the DT curriculum using a theoretical model advocating viewing the world from the theoretical perspective of a computer scientist (Wing, 2010) as a the comprehensive framework for the entire DT curriculum.

101.2 ACCE is concerned with the emphasis on Abstraction “underpinning all content in DT”. While ACCE acknowledges that Abstraction is important, it is one aspect of Computational Thinking, and Computational Thinking is only one aspect of Digital Technologies.

101.3 ACCE recommends that in addition to Computational Thinking, there needs to be included engineering processes for the development of solutions (i.e. software engineering, information systems development, computer systems analysis, etc.) that more effectively support a project based approach.

102. Content descriptions based on the key concepts will provide scope to incorporate future developments in digital technologies.

102. ACCE recognises the impossibility of effectively future proofing the Digital Technologies curriculum and supports the approach of not specifying particular technologies or products as far as possible in the curriculum.

103. Content descriptions based on the key concepts will help prevent the curriculum from dating too quickly.

103.1 ACCE is concerned that the reliance on Computational Thinking by DT where Computational Thinking is very new, being interpreted in many different ways, and was never intended for use as an all encompassing framework for a curriculum such as Digital Technologies education, has the potential to date this term as a concept and framework very quickly.

104. The description of the key concepts is clear.

104.1 ACCE is concerned that Computational Thinking concepts are difficult to explain in short summaries, and indeed difficult even for experts to interpret with consensus. This will present ongoing difficulties as different entities and resources present these concepts in different ways.

104.2 ACCE is concerned that the Key Concepts and Computational Thinking concepts as presented do not interrelate effectively and lack support for DT processes, especially Design Processes.

104.3 ACCE is concerned that the Interactions and Impact key concept relates more directly as an element of the ICT General Capability, Personal and Social Capability General Capability and Ethical Understanding General Capability.

104.4 ACCE recommends that the interactions key concept be reframed as a specific elaboration of the General Capability as it relates to Digital Technologies, not as a distinct content/key concept of DT.

Information and communication technology in the Australian Curriculum

106. The relationship between Digital Technologies and the general capability, ICT capability, is clearly stated.

106.1 ACCE recognises the efforts to make this relationship clear but remains concerned that the distinction between Digital Technologies and the ICT General Capability needs to be very clear and distinct to maintain the integrity of Digital Technologies as a subject.

106.2 ACCE is concerned that the embedding of ICT General Capability elements into the subject is unclear and inconsistent, confusing the distinction between DT and the ICT General Capabilities. While online interaction has been embedded, it is not clear what other General capabilities (from all of the capabilities) are also embedded in Digital Technologies.

106.3 ACCE is concerned that the first sentence describing the relationship between DT and ICT General capabilities is focused on introducing the concept of focus areas for ICT General Capability in DT and Media Arts.

106.4 ACCE recommends that the initial focus of this explanation be on the distinction between DT and the ICT General Capability.

106.5 ACCE is concerned that the relationship between Digital Technologies and Media Arts has undue attention and is inconsistent with no other relationships between DT and other learning areas references.

106.6 ACCE is very concerned that an area traditionally taught in computer education at F-12 and tertiary studies, digital/multimedia development, is being specifically constrained in the study of Digital Technologies.

106.7 ACCE is concerned that removing “the operational mechanics of producing images, animations, video and audios” significantly constrains the teaching of digital/multimedia aspects in Digital Technologies and such constraint is not consistently applied in the Australian Curriculum. i.e. “the operational mechanics of producing written work” is unlikely to be constrained from other learning areas and only permitted in the English learning area. The special treatment of digital/multimedia is considered very short sighted and inappropriate as the increasing application of digital/multimedia becomes equivalent to the development of written work.

Learning in Digital Technologies

107. The description of learning in Digital Technologies is appropriate.

107.1 ACCE generally supports the description of learning as described in the Digital Technologies.

107.2 ACCE is concerned with the specific emphasis on Communicating Online and this is considered more appropriate as an application of ICT General Capability as this learning should not be constrained in any way specifically to Digital Technologies.

107.3 ACCE is supportive of a focus on play at all band levels in Digital Technologies but does not see this effectively reflected in the Content Descriptions or elaborations even in the early years.

107.4 ACCE is concerned with the equal emphasis on communications suggested by defining two broad areas of Automation and Communications, and does not see this reflected in the elaborations or other curriculum structures.

ACCE has chosen to make a response F-10. Questions 108 through 152.

Band level descriptions

The band level descriptions provide a clear overview of the focus and breadth of learning in this band of schooling.

ACCE is supportive of the overview of the bands.

Content descriptions

The draft content descriptions are clear and unambiguous statements of what students should be taught.

ACCE is concerned that how material has been presented does not generally support clear and unambiguous understanding of what students should be taught.

The draft content descriptions are pitched appropriately for this band level.

ACCE is generally supportive of the content descriptions and their levels.

ACCE is concerned that the possibility of teachers and students addressing elements of content in earlier and later bands is not stated. While Content Descriptions should define the focus of content in defined bands, but should not be exclusive.

The draft content descriptions describe an appropriate progression across band levels.

ACCE is supportive of the developmental nature of the progression though how this occurs along various content themes across the entire F-10 curriculum should be made clearer.

The draft content descriptions provide a manageable set for this band level.

ACCE is supportive of the developmental nature of the content descriptions.

ACCE is concerned that some content descriptions require further explanation for teachers unfamiliar with the subject to interpret but acknowledges that this is not necessarily the role of a curriculum document.

ACCE is concerned that there is not a clear structure, or suggested structures, for how content descriptions can be organised into learning activities achievable in the suggested indicative time allocations. In contrast to Design and Technology where it is very clear that specific contexts can be broken down by term/semester and addressed through design projects with a specified structure, DT does not have any such support or direction.

ACCE recommends that Band Level content descriptions be structured to support a common theme or other structure that can integrate content descriptions so they are achievable by common activities such as a design project. This is particularly important in the F-2 band where 5 hours per year make attempts to address DT piecemeal especially challenging.

Content elaborations

The draft content elaborations provide clear and relevant illustrations of the content descriptions.

ACCE recommends that it be made much clearer that content elaborations present suggested means of achieving the Content Descriptions and do not represent an aggregation of required content.

ACCE is concerned that in some cases the content elaborations are not presented as options but as elements that are necessary for each other and as such suggest a list of required content, particularly evident where a developmental process is described.

ACCE recommends that a list of Content Descriptions, without elaborations, be presented before the elaborations to make clearer that the Content Descriptions represent the required element, with elaborations provided as different means of addressing the required Content Descriptions.

ACCE is concerned that significant content that is traditionally addressed in Senior Secondary computing curricula has been included in Digital Technologies. Specific concern exists around the inclusion of relational database development.

Achievement standards

The draft achievement standard is a clear and unambiguous statement of the expected quality of student learning.

The draft achievement standard is pitched appropriately for this band level.

ACCE is supportive of the achievement standard statements as appropriate descriptions of the content to be addressed for the bands.

ACCE is concerned that no consideration is made of students progressing more or less quickly with respect to Year level bands is not addressed and that this has been traditionally a significant issue with Digital technologies studies with some students achieving at significantly higher levels than their peers.

ACCE recommends that acknowledgment be made that many Digital Technologies learning activities will permit students to demonstrate achievement at higher levels.

The draft achievement standard describes an appropriate progression of expected learning across band levels.

ACCE is concerned that the expected Achievement standards is a much clearer description of the content than the Content Descriptions and elaborations. Unpacking the Achievement Standards currently represents a parallel view of Content requirements and this may be more effectively presented as an introductory summary of the Content Descriptions than as a reflection of Achievement Standards as no measure of standard (as opposed to a description of content to be addressed) is described.

Other Comments

153. Please provide any additional comments on the draft Australian Curriculum: Digital Technologies (for example, strengths, priority areas for improvement).

153.1 ACCE acknowledges the significant achievement that a developmental Digital Technologies curriculum from F-10 is for computer education in Australia.

153.2 ACCE recognises the significant implementation issues that will emerge from the introduction of a new subject into the Australian Curriculum but that the rationale for this inclusion is clear and indisputable.

153.3 ACCE is supportive of the content described in the curriculum.

153.4 ACCE recommends that structural improvements be made to support content being combined to more readily facilitate integration, projects and project based learning.