AUSTRALIAN CURRICULUM, ASSESSMENT AND REPORTING AUTHORITY

Draft Shape of the Australian Curriculum: Technologies

Consultation Report

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Executive summary

Introduction

The draft *Shape of the Australian Curriculum: Technologies* was published in March 2012. It was the subject of national consultation from 14 March to 3 June 2012.

In summary, the draft Shape paper proposed:

- from Foundation to Year 8, a curriculum structure with two strands: Design and Technologies and Digital Technologies
- from Years 9 to 12, a curriculum structure with two subjects: Design and Technologies and Digital Technologies
- a sub-strand/strand structure of Knowledge and understanding and Processes and production
- an overarching idea: engaging in creating preferred futures.

Purpose

This report presents the key findings from the consultation feedback for the draft *Shape of the Australian Curriculum: Technologies*. It outlines the methodology used to collect and analyse consultation data, details of quantitative feedback and a summary of qualitative data. This analysis of consultation data informed revisions to the draft Shape paper and provided the directions for writing the Australian Curriculum: Technologies.

Consultation participants

There were two sources of consultation feedback:

- an online survey on the ACARA website where respondents completed a rating scale for each question and were able to write a comment
- written submissions that were faxed, emailed or posted to ACARA.

Feedback was submitted by stakeholders throughout Australia, including:

- state and territory education (curriculum and school) authorities
- organisations such as professional teacher associations, schools, businesses, universities and non-government organisations
- individuals, including teachers (current and retired), academics, those in industry, parents and students.

Methodology

The consultation feedback was analysed in relation to the sections of the draft *Shape of the Australian Curriculum: Technologies*. The analysis, which is summarised in this report, points to the key strengths and matters for improvement that were identified in feedback.

The online survey questions are presented in Appendix 1. The providers of submissions (classified by type) are presented in Appendix 2. Quotations included in this report are representative of the typical comments expressed by education authorities, organisations and individuals Australia-wide. Keys to the short forms used for attributions at the end of quotations are also included in Appendix 2.

Key strengths

There was support for the following directions:

- Technologies as a learning area in the Australian curriculum
- the emphasis on the entitlement of all students to access Design and Technologies and Digital Technologies from Foundation to Year 8
- two discrete technologies strands/subjects: Design and Technologies and Digital Technologies
- the overarching idea: engaging in creating preferred futures
- the scope and sequence (with minor amendments to progression and clarification of language, in particular for Digital Technologies)
- the broad descriptions of the relationship of the General capabilities and Cross-curriculum priorities to the Technologies curriculum.

Matters for improvement

The following issues were consistently raised in the consultation feedback:

- concerns around nomenclature and the clarity between subjects, strands and sub-strands
- a need to strengthen references to agriculture as food and fibre production
- a need to strengthen references to food, nutrition and health
- inclusion of a paragraph to describe how ICT capability is addressed in Design and Technologies (although 86 per cent of respondents supported the statement about the ICT general capability and 72 per cent understood the difference between the capability and the Digital Technologies curriculum)
- further clarity needed around how technologies contexts are described and which would be prescribed
- clearer explanation about which electives are to be developed by ACARA and which can continue to be offered by states and territories
- the paper needs to be more accessible to its audience; a number of respondents described it as clear and coherent, however, others found it difficult to navigate, repetitive and including technical language not appropriate for primary years' practitioners (especially in Digital Technologies)

- implementation issues:
  - the proposed indicative hours for writing Technologies curriculum were interpreted as time allocations for teaching and were generally deemed as insufficient for in-depth and sustained learning
  - factors such as teacher training, professional learning, resources and equipment will require consideration if the intention of the Technologies curriculum is to be realised. This particularly applies to Digital Technologies in the primary years.

Conclusion

Overall the consolidated findings of all feedback indicate high levels of support (over 79 per cent approval in survey responses) for the directions proposed in the draft *Shape of the Australian Curriculum: Technologies*.

The ACARA Board acknowledges with appreciation the contributions of all respondents to the consultation.

1. Introduction

1.1 Consultation scope

The draft *Shape of the Australian Curriculum: Technologies* was released for public consultation on 14 March 2012. The online consultation closed on 3 June 2012, with written submissions received until 8 June 2012.

Opportunities to provide feedback were promoted across education and technologies organisations, including authorities, specialist and generalist teachers, professional associations, industry stakeholders, parents, students and academics in the fields of education and technologies. Written submissions were also received from some of these organisations and some individuals.

In summary, the draft Shape paper proposed:

- from Foundation to Year 8, a curriculum structure with two strands: Design and Technologies and Digital Technologies
- from Years 9 to 12, a curriculum structure with two subjects: Design and Technologies and Digital Technologies
- a sub-strand/strand structure of Knowledge and understanding and Processes and production
- an overarching idea: engaging in creating preferred futures.

1.2 Purpose

This report summarises the key findings from the public consultation on the draft *Shape of the Australian Curriculum: Technologies.* It outlines the methodology used to collect and analyse consultation data, provides the aggregated results of quantitative feedback and summaries of qualitative feedback. The analysis of consultation data informed the revision of the draft Shape paper into the final document to guide the writing of the Australian Curriculum: Technologies.

1.3 Methodology

The feedback from the online survey was analysed using the online survey software application, Survey Methods. The instrument used for the analysis of the optional commentary accompanying the online survey responses and the submissions was NVivo 9 software. Quantitative analysis from the online surveys is presented in pie charts and column graphs for each section. Each chart and graph represents a sample size of n = 249 unless otherwise indicated. (Some charts present sub-sets of data; in some instances not all of the 249 survey respondents completed the agree/disagree component of every question.)

Respondents' accompanying commentary was analysed using NVivo9. For each question in the survey the comments were categorised as concerns, strengths and suggestions, with specific topic nodes developed within these three categories. An identical coding procedure was used for the written submissions. This analysis of all commentary has been used to

illustrate the qualitative findings of the consultation. The commentaries also demonstrate the diversity of views among stakeholders.

1.4 Interpreting the draft Shape paper

Some of the comments made in response to the draft Shape paper indicate that respondents compared the draft document to current state or territory curriculum frameworks or syllabuses. Comments to this effect have been noted but are not repeated in this report. Further, the purpose of the draft *Shape of the Australian Curriculum: Technologies* is to give a broad overview of the intended direction for writing the new curriculum.

Some comments refer to implementation concerns of time allocation, pre-service teacher education and provision of resources. The 2008 COAG National Education Agreement section 19 (e) (Standing Council on Federal Financial Relations n.d., p. 8) http://www.federalfinancialrelations.gov.au/content/national_agreements.aspx indicates that states and territories are responsible for implementing the Australian Curriculum. Commentary on implementation concerns is included in this report.

1.5 Summary of respondent demographics

Online survey

ACARA received 249 responses to the online survey. Of this total, 187 were individuals and 62 were groups. Table 1 provides a breakdown of respondents by location and category.

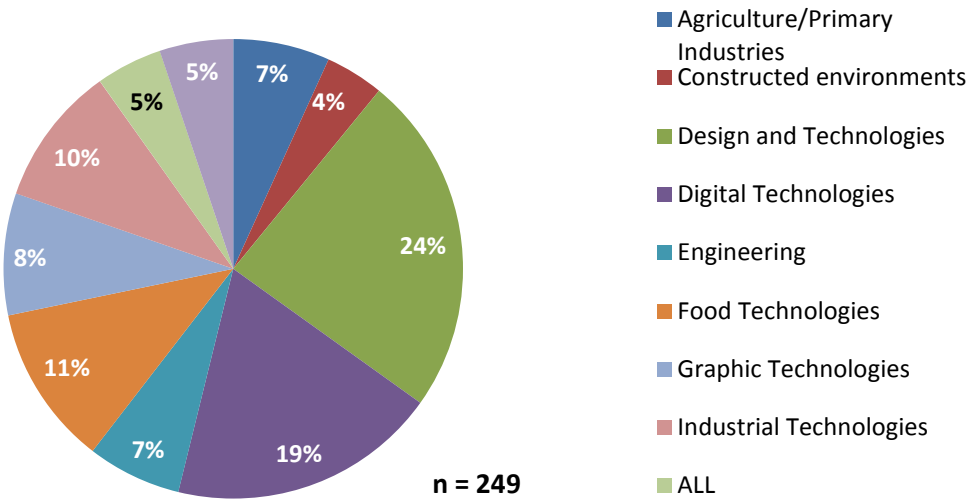
Table 1: Online survey respondents by location and category

Category of respondent	Location										Total
	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	National	Inter-national	
School leader		7	2	3				2			14
Primary generalist	1	3	1	2			3	1			11
Primary specialist			1		1	1					3
Middle years generalist			2								2
Middle years specialist			2			1					3
Secondary generalist		2	1	1	2		2				8
Secondary specialist	2	68	5	9	6	9	6	28			133
Academic	1	1		3				1		1	7
Industry/business	1	2		3	2			2	1		11
Other	2	20	1	5	1	1	5	3			38
Not identified	1	9		2		2	1	4			19
Total	8	112	15	28	12	14	17	41	1	1	249

Technologies representation

Design and Technologies and Digital Technologies were the most represented technologies contexts, as shown in Figure 1.

Fig. 1: National representation of respondents by technologies context



State/territory representation

As shown in Figure 2, the largest proportion of individual online survey respondents was from New South Wales, followed by Western Australia and Queensland. Victoria and Tasmania each had six per cent of the representation; South Australia, the ACT and the Northern Territory all had smaller proportions.

Fig. 2: Representation of individuals by state/territory

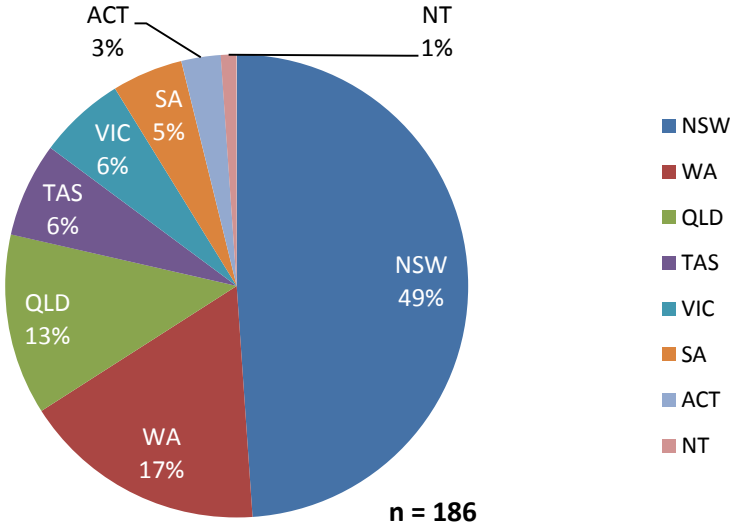
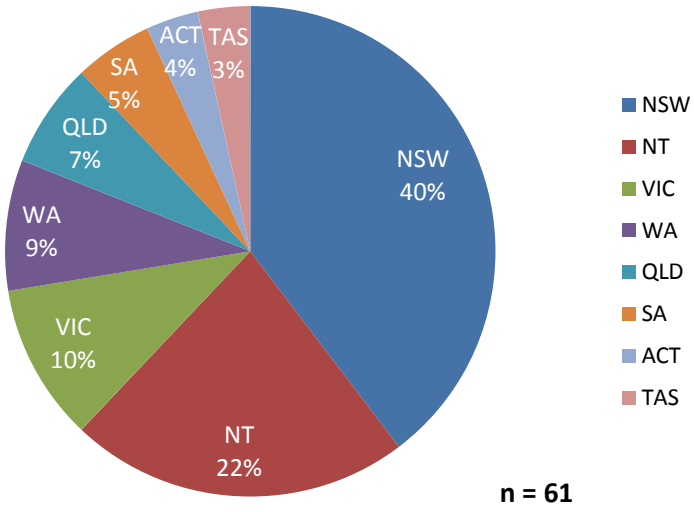


Figure 3 shows the proportions of organisational respondents to the online survey. The largest proportion was New South Wales, followed by the Northern Territory, Victoria,

Western Australia and Queensland. The ACT, South Australia and Tasmania were each less than five per cent.

Fig. 3: National representation of organisations by state/territory



n = 61

The written submissions are shown by sector and number in Table 2. See Appendix 2 for the names of the organisations that provided feedback.

Table 2: Number of written submissions, by sector

Sector	No. of submissions
State and territory education authorities	5
Professional teacher associations	8
Industry	8
Education	7
Organisations	3
Schools	2
Universities	2
Individuals	7
Total	**42**

2. Major findings

The following section summarises the major findings from the consultation, identifying key strengths and matters for improvement. There was also much commentary around implementation issues which were not the prime focus of consultation.

2.1 Summary of key strengths

Technologies as a learning area in the Australian Curriculum

Technologies as a learning area in the Australian Curriculum was strongly supported. Feedback from the respondents endorsed the general direction, intent and focus of the draft Shape paper for Technologies. There was also commentary around the alignment to the Melbourne Declaration and Early Years Learning Framework. The Aims of the learning area were strongly supported.

Entitlement from Foundation to Year 8

The emphasis on the entitlement of all students to access Design and Technologies and Digital Technologies from Foundation to Year 8 was strongly supported.

Support for two discrete technologies strands/subjects

Respondents supported the emphasis on the entitlement of all students to access Design and Technologies and Digital Technologies from Foundation to Year 8. They agreed that the scope and sequence for each provided a logical learning continuum. However, there was concern raised about the proposed structure, that is, the strand and subject structure.

The overarching idea

Respondents indicated that the overarching idea of ‘Engaging in creating preferred futures’ for both Design and Technologies and Digital Technologies is appropriate for a twenty-first century Technologies curriculum. The focus on futures and sustainability was supported.

Scope and sequence

There was strong support for the scope and sequence, with minor amendments to progression and clarification of language in particular for Digital Technologies.

General capabilities and Cross-curriculum priorities

There was strong support for the broad descriptions of the relationship of the General capabilities and Cross-curriculum priorities to the Technologies curriculum.

2.2 Summary of key matters for improvement

Structure

While there was substantial support for the two strands from Foundation to Year 8, there were concerns around nomenclature and the clarity between subjects, strands and sub-strands. Conflicting viewpoints were presented. There were a number of written submissions and online survey responses proposing an alternative structure of two subjects from Foundation. While most argued that separation was required in order to maintain the identity of Digital Technologies, an alternative and compelling argument was that in attempting to write generically, it is then difficult to make each subject specific enough, as they are very distinct areas in their own right.

A number of comments suggested that separate processes for the two strands/subjects created a false distinction between the strands and that the design process was an appropriate common process across all aspects of Technologies.

Agriculture in the Australian Curriculum

The need to strengthen references to agriculture as food and fibre production was identified. Submissions from agriculture and primary industry organisations indicated that references to agriculture (food and fibre production) were insufficient. There was also a request for the creation of an elective subject for Agriculture from Years 7 to 12.

> *It is thus critical for a clever workforce which has the technological knowledge to produce food for the world in a sustainable way with increasingly scarce resources to be a cornerstone of any National Curriculum. The current status of the Technologies does not appear to provide the depth of training and knowledge needed to meet this critical need. The Technologies must be far more explicit in the inclusion of Agriculture, Food and Fibre production in the national curriculum.* (Submission: NAAE)
>
> *Food and Fibre production should be an official elective from years 7−12 with an ACARA mandated curriculum.* (Submission: PIEF)

Food and nutrition in the Australian Curriculum

Submissions from health, nutrition and home economics organisations indicated that the references to food, nutrition and health needed to be strengthened and a statement regarding the relationship between Technologies and Health and Physical Education was needed.

> *The development of the Technologies Curriculum is welcomed by the dietetic professions as a means of delivering a broad range of health and nutrition related technology to school-aged children. The Curriculum should provide the opportunity for students to develop health-related skills and knowledge which complement and extend beyond the Health and Physical Education Curriculum. However, we are concerned that food and nutrition related technologies are not adequately represented in this Curriculum.* (Submission: DAA)

Difference between ICT general capability and Digital Technologies

While 86 per cent of respondents supported the statement about ICT capability and 72 per cent understood the difference between the capability and the curriculum, there is still need for a paragraph to describe how ICT capability is addressed in Design and Technologies.

> *We are particularly pleased to endorse the distinction made between educating all students for the development of a general capability in ICT, to produce confident users of ICT in our digital century, and educating those who choose, through the Digital Technologies strand and subject, in the core of the ICT disciplines to produce developers of information solutions.* (Submission: ACS)

Technologies contexts

Further clarity is needed around the technologies contexts. A range of issues over the nature of the technologies contexts was raised. These included the need to identify a rationale for the technologies contexts; concerns relating to the number, treatment, appropriateness and classification; and concerns about how the contexts might be used to deliver the curriculum.

Organisation of the learning area: Years 9–10 elective subjects

There were a number of queries about the description of the electives developed by ACARA and those that could be offered by states and territories. Further explanation is needed.

Repetition in and clarity of the paper

While there were a number of respondents who described the paper as clear and coherent, others found it difficult to navigate, repetitive and including technical language not appropriate for primary years' practitioners (especially in Digital Technologies).

2.3 Implementation issues

Time allocation

The proposed indicative hours for writing Technologies curriculum were interpreted as time allocations for teaching and were generally deemed as insufficient for in-depth and sustained learning.

Teachers and resources

Respondents expressed concern about the level of teacher training and resources that will be needed for implementing the proposed Technologies curriculum. Implementation concerns including pre-service teacher education programs and funding for teaching equipment were frequently raised.

The level of detail

Some respondents commented that the paper fails to provide the detail required to develop teaching and learning programs. In these cases, respondents appeared not to have understood that the purpose of the Shape paper is to inform the writing of the detailed curriculum which will follow, rather than being *the* 'curriculum'.

3. Analysis of feedback

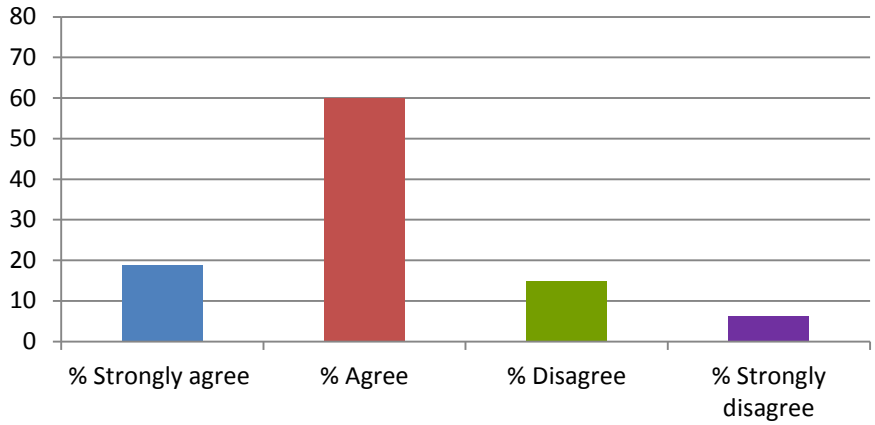
This section provides a focus on each of the sections of the draft Shape paper. The charts refer to the online survey responses. The quotations are taken from the optional comments in surveys as well as written submissions. The quotations have been selected because they are representative of a range of views and/or provide interesting observations.

3.1 Background

The Background section provided contextual information for the Technologies learning area, attributing key concepts to the educational goals set out in the *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA 2008, pp. 8–9) and building upon the vision for children's learning and early childhood pedagogy as outlined in *Belonging, Being & Becoming: the Early Years Learning Framework for Australia* (DEEWR 2009). It also explained the term 'Technologies', the distinct areas of knowledge within that and the nature of technologies contexts relevant to the learning area.

Question 8: The Background for the Australian Curriculum: Technologies makes clear what the learning area includes.

Fig. 4: Responses to Question 8 – Background



Key strengths

A key strength in the Background, in both online survey responses and written submissions, was identified as the clear alignment to the Melbourne Declaration and Early Years Learning Framework. Respondents identified the significance of the opening section of the Background, which clearly expressed the important contribution of the Technologies curriculum and its position within twenty-first century education.

Feedback also suggested that respondents were satisfied with the articulation of the scope and aims presented in the Background, and the use of and rationale provided for the term 'Technologies'.

> *The Background and Introduction overall appears clear and coherent. The document appears to be well written and aligned with the intent of the Melbourne Declaration. It is recognised that both ICT and Design & Technology are central to Australia's skilled economy and this paper provides a good basis for further work by the advisors and syllabus writers.* (Submission: QCEC)

> *Promises much in terms of preparing creative and skilled students for the future, able to thrive and compete in a globalised world.* (Survey: Individual, NSW)

> *Positive about use of term 'technologies' providing broader understanding of area than technology. It was suggested that 'Technologies' implies plurality, reflecting the diverse 'ways of thinking, engaging/communicating, creating' through contexts and processes and with an array of materials, media etc., (digital and otherwise).* (Submission: QCEC)

Matters for improvement

While both online and written submission respondents generally supported the term 'Technologies', a number indicated that there should be a clear and well-articulated definition. It was noted that the language used in the Background was too technical and this may confuse and alienate teachers from engaging with the document. Respondents also indicated that the Background information was too broad and lacked specificity to ensure consistency.

> *No definition of the term Technologies. The definition of Design and Technologies is reasonably well supported, but teachers responding to the survey note that some language and computational concepts used in the Digital Technologies definition are beyond the knowledge of a non-specialist teacher. This has been particularly evident from F–6 teachers.* (Submission: TiPS)

Both online survey and written submission respondents suggested that while they welcomed the inclusion of the diverse range of technologies contexts, the fields of endeavour in which students will apply technologies processes and production – for example, agriculture and primary industries, constructed and managed environments, entertainment, food technology, design for manufacture and the realm of digital technologies – each required supplementary information in order to ensure they are covered with depth and consistency.

Respondents also questioned the validity of some of the contexts identified, for example, retail and entertainment, and raised concerns over the omission of contexts such as food and nutrition. Other issues included a need to include a rationale for the technologies contexts; concerns relating to the number, treatment, appropriateness and classification; and how the contexts might be used to deliver the curriculum.

> *No clear explanation describing how contexts might be used to deliver the curriculum – the contexts seem to cover both what are recognised as the 'subject' areas through which Technologies are taught (particularly at the secondary level), but could also be used as a thematic focus for integrated Technologies learning.*

> *While it is acknowledged that the paper needs to address a range of technologies contexts there are concerns relating to the number, treatment, appropriateness and classifications of these. Compromises are evident because the paper attempts to encapsulate diverse fields (contexts) within the technologies, all of which are typically subjects in their own right.* (Submission: VIC)

Several online respondents and submissions from agriculture and primary industry organisations raised concern about the omission and lack of focus on agricultural technologies and primary industries in the Technologies Shape paper.

While it was acknowledged that agriculture was identified as a technologies context and field of endeavour, it was also noted that there was minimal reference made beyond this.

> *Paragraph 5 in the preamble providing the outline, which applied to food and fibre production, would tick all the boxes. However, on reading the document further, paragraph 7 states, 'these could include agriculture and primary industries, constructed environments, engineering, entertainment, food technology ...', implying that food and fibre production will remain an option for teachers.* (Submission: NFA)

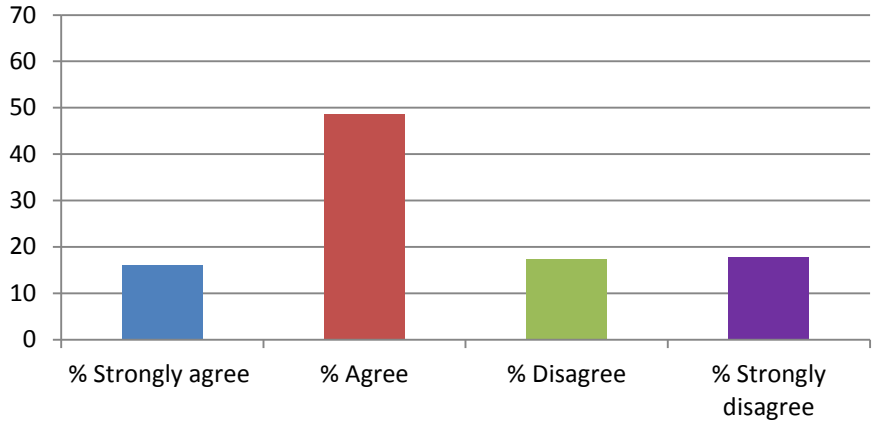
3.2 Key considerations

The Key considerations section of the paper aimed to ensure respondents focused on the structure of the curriculum. If respondents did not agree with the proposed structure, advice was invited on alternative structures that would best cater for a flexible and dynamic Technologies curriculum for the twenty-first century.

Question 9: A structure based on Design and Technologies and Digital Technologies as two strands in Foundation to Year 8 followed by two distinct subjects in Years 9 to 10 is appropriate for the development of the Technologies curriculum.

In response to question 9, 65 per cent of survey respondents 'strongly agreed' or 'agreed' that the proposed structure as described was appropriate for the development of the Technologies curriculum. Considering that most other questions recorded agreement at 79 per cent or higher, this indicates that the structure is the most contentious aspect of the paper. This is consistent with the views expressed in the written submissions.

Fig. 5: Responses to Question 9 – Key considerations



Key strengths

Both online survey and written submission respondents who agreed with the proposed structure for Foundation to Year 8 generally indicated that it provided flexibility both for the development of teaching and learning programs and to 'allow schools and systems to respond to the curriculum to suit their own circumstances'. It also provided the capacity for integrated units of work, particularly in the primary years.

> *DECD supports the proposed structure for the Technologies learning area comprising the two strands, Design and Technologies and Digital Technologies for Foundation–Year 8 and two subjects for years 9 to 12.* (Submission: SADECD)

> *It is felt that the two strands of Design & Technologies and Digital Technologies offers sufficient diversity of technological learning experience which should inspire young people and encourage greater participation in technology subjects. The inclusion of technology across other industry contexts is also seen as positive reinforcement of the enabling power of technologies while also underlining the diversity of careers offered through ICT.* (Submission: ITIIC)

Matters for improvement

Respondents who disagreed with the statement did so for a variety of reasons including that a two strands/subjects structure is too narrow and restrictive; the structure lacks justification; there should be one subject with one process and no differentiation between Design and Technologies and Digital Technologies until Year 9; Digital Technologies are a subset of technologies and should only be represented separately as the ICT capability.

> *I am concerned that if we place digital technologies into a separate entity in the curriculum, we will stifle the creativity and innovation that emerges when students have choice and control over the development of solutions. I believe that up to year 9, students should be given choice of material, device, tool, technique, process etc in their journey to respond to a problem or opportunity.* (Submission: Individual)

> *The separation of the Technologies learning area into two discrete strands Design and Technologies and Digital Technologies without a cohesive framework is strongly opposed … While integration of the two strands F–8 is noted as a possibility, this is impeded by the lack of a cohesive framework based on a common process.* (Submission: TiPS)

> *Concern over the split in the 2 strands to 2 subjects in years 9 and 10. Why? Digital is just another context of the Technologies as is materials, textiles.* (Submission: AISWA**)**

> *The opportunity cost of such an emphasis on digital technologies is that the Design Technologies (and contexts) will be diminished such that the ability to have relevant outcomes may be severely reduced.* (Submission: NAAE)

A proposal was also made for two separate subjects from Foundation. This was supported by a number of written submissions.

> *ACCE holds that the current status of Digital Technologies as a strand, denies the opportunity to clearly identify the unique characteristics of CDT [Computing and Digital Technologies]. It forces a compromise regarding aims, overarching ideas and the sub-strand structure, which collectively diminish the capacity of this dynamic area to express and realise its vision and content.* (Submission: ACCE)

> *There are two fundamental reasons for this proposition. The first is that Digital Technologies is a sufficiently distinct area of knowledge to warrant being treated as a discrete subject, albeit within a broad learning area. The second is that the area of Digital Technologies in the school curriculum is the subject of wholesale review across the developed world. New developments in this area cannot be done justice within a structure that conflates Digital Technologies with a broad range of other technologies.* (Submission: VIC)

> *The attempt to write generically to include both Design and Digital together at times seems a bit clumsy and makes it difficult to be specific as even though there are parallels and overlaps, they are very distinct areas in their own rights. Wondering if it wouldn't be better to present them as two subjects early on, which would allow each one to develop with its own special language. This would allow the writers to be more specific and true to each subject.* (Submission: School, Tasmania)

Suggestions were made for name changes for both Design and Technologies and Digital Technologies including Manufacturing technologies and Communication technologies, Information and communication technology; Computing and digital technologies; Communication technology; Computer Science; Computing and information technologies and a number of others.

> *We have a concern at the use of the term 'Digital Technologies' rather than 'Information and Communication Technologies (ICT)' as the name used for the strand/subject.* (Submission: ACS)

> *Recommended that Digital Technologies have the word 'Computer' or 'Computing' included such as 'Computers and Digital Technologies'.* (Submission: ICT Educators)

> *Prefer a name change to the strand so as not to confuse it with ICT General Capability. Names such as Computing would clearly position it to reflect the focus of the strand.* (Submission: Lutheran Education Queensland)

3.3 Introduction

The Introduction provided the rationale for the teaching of Technologies, reflecting the traditional, contemporary and emerging nature of technologies.

Question 10: The *Introduction* for the *Australian Curriculum: Technologies* makes clear the important contribution of the Technologies curriculum for all young Australians.

Question 11: The section, *The contribution of technologies education to students' lives,* appropriately captures the main contributions to students' education.

Question 12: The section, *Technologies education for diverse learners,* appropriately shows how the Technologies curriculum will address student diversity.

Overall, the response to each of the three questions relating to the Introduction was overwhelmingly positive, with many respondents commenting on the clarity, coherence and relevance of the stance taken to position the Technologies curriculum in the dynamic and changing nature of the twenty-first century. In response to question 10, 87 per cent of online survey respondents 'strongly agreed' or 'agreed' that the Introduction made clear the important contribution of the Technologies curriculum for all young Australians. In response to question 11, 79 per cent of online survey respondents 'strongly agreed' or 'agreed' that

the Technologies education for diverse learners section appropriately shows how the Technologies curriculum will address student diversity. These levels of agreement were also reflected in the written submissions.

Fig. 6: Responses to Questions 10 and 11 – Introduction are combined to represent the median

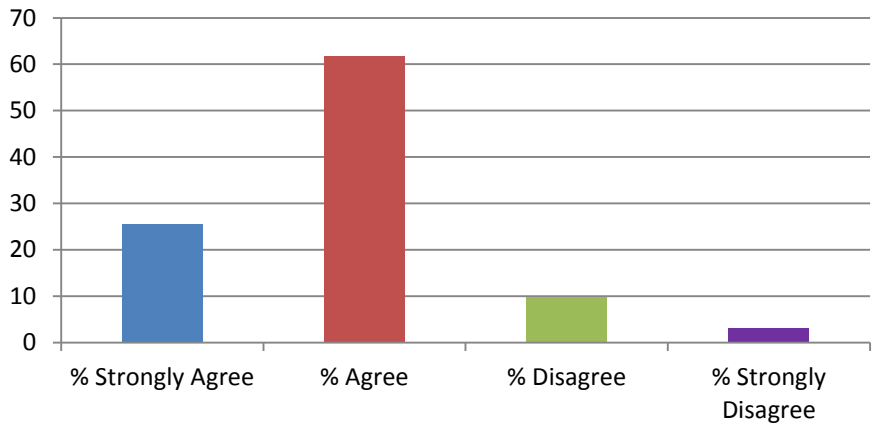
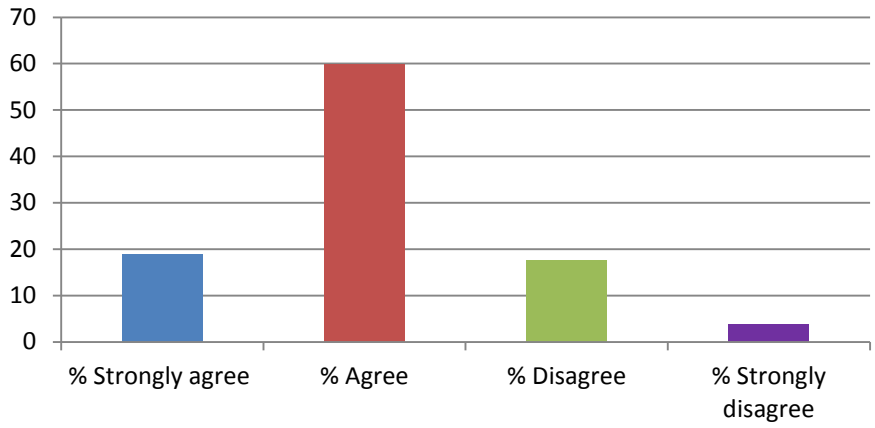


Fig. 7: Responses to Question 12 – Technologies education for diverse learners



Key strengths

A key strength in the Introduction, identified in both online survey responses and written submissions, was the support for the forward-thinking nature and vision of the curriculum. Respondents also acknowledged a strength of the Introduction as providing the opportunity for students to become creative, informed and discriminating users and producers of a variety of technologies, and as a result, good digital and global citizens.

> *APPA agrees with the forward thinking nature of this section and the inclusion of creative thinking and responses to the use of technology in the classroom and homes of students. There is strength in linking the design element with the digital reality of society. The emphasis on evaluating and reflecting on technologies, drawing connections and critically examining its use in order to achieve solutions is applauded. The flow from past to present to future is an important element of technologies and it is felt that this is acknowledged in this section.* (Submission: APPA)

> *ASIC strongly agrees with paragraph 17 in particular 'It is important that, as a nation, we make connections between technologies, creativity and enterprise as a catalyst for the 21st century … ASIC commends ACARA on paragraph 20 and appreciates the strong consumer and financial literacy synergies in this paragraph.* (Submission: ASIC)

> *[Technologies education for diverse learners] paragraph 29 … is an excellent one and it is hoped that the writing of the Australian Curriculum: Technologies can bring these tenets alive with clarity and supportive direction.* (Submission: Media Access)

Matters for improvement

Respondents who disagreed with this section of the draft Shape paper cited that it was too lengthy, quite wordy and incoherent, even though the underlying rationale was commended. Some respondents, including written submissions, indicated that the Introduction was repetitive and that the duplication rendered the Introduction unclear, with a risk that this would disengage teachers.

> *This section is also repetitive in both ideas and language which results in its essential features being 'lost in the translation'. APPA would see as vital that the Shape Paper, in guiding the development of curriculum, will present what is essential in a clear and concise way. The risk is that, if carried through to the curriculum document, such an approach will either make the document unusable for primary teachers planning activities or, if deemed incomprehensible, will invite ridicule and therefore be ignored.* (Submission: APPA)

A recurring theme presented throughout both the online and written submissions is the belief that greater weighting has been afforded to Digital Technologies throughout the paper.

> *The focus of the introduction is not equally weighted between the two strands. The statements, when dissected are predominantly focused on the contribution of ICT learning when compared to design technology statements.* (Survey: Individual, Victoria)

> *All areas don't have equal footing - appears to be totally digitally based - where is the hands on practical content. In the rural areas our student prefer to work with their hands to solve problems practically – don't always need digital access. Not always available in rural and isolated areas.* (Survey: Individual, NSW)

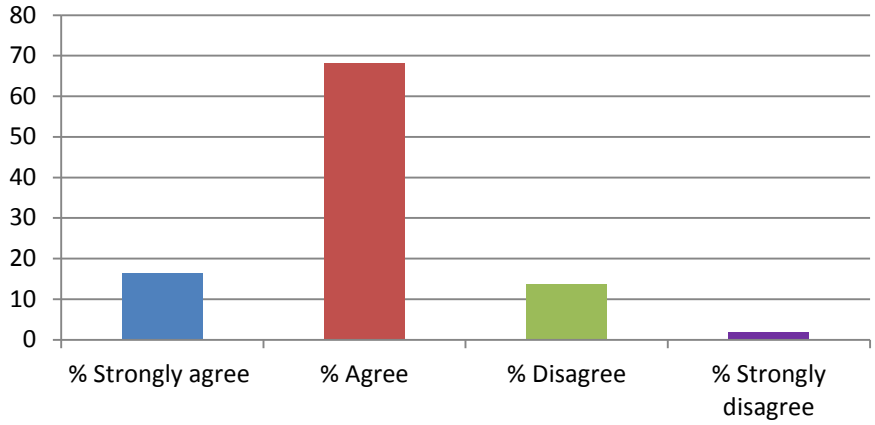
There were a range of suggestions for editorial changes to the Technologies education for diverse learners section.

3.4 Nature of the Technologies learning area

The nature of the Technologies learning area in the draft *Shape of the Australian Curriculum: Technologies* paper outlined the technologies knowledge and understanding and processes and production that will guide students to work towards the overarching idea of engaging in creating preferred futures.

Question 13: The section, *Nature of the Technologies learning area,* appropriately reflects the features and key concepts of Technologies education.

Fig. 8: Responses to Question 13 – Nature of the Technologies learning area



Key strengths

In response to question 13, 85 per cent of online respondents 'strongly agreed' or 'agreed' that the Nature of the Technologies learning area reflected the features and key concepts of Technologies education. Respondents noted particular strengths of this section were the inclusion of values-based education; with reference made to the relational, familial, community and global settings.

> *There remains much work to be done to determine the detailed content of the strands and subject, but ACS believes that a solid first step has been taken in the ideas presented in the section 'Nature of the Technologies Learning Area'.* (Submission: ACS)
>
> *Good inclusion of person, community and global issues. Like the inclusion of sustainability and value based education.* (Survey: Individual, NSW)
>
> *The relationship between contexts and considerations, as communicated is invaluable to teachers.* (Submission: HEIA)
>
> *Paragraph 32 talks about helping students see interrelationships between the academic disciplines. This cross curricular creative and innovative thinking so needed for our future society is seen to be unique in this learning area.* (Submission: AISWA)

Reference to the project management learning approach to scaffold the processes and production was particularly commended by both online and written submission respondents.

> *This curriculum ... encourages a dynamic, project management style approach to curriculum delivery which also supports job readiness.* (Submission: ITIIC)
>
> *Encouragement of innovative and enterprising approaches to technological discoveries and developments should provide a strong platform from which to enter the workforce or participate in further study or research. The inclusion of a dynamic, project management style approach to curriculum delivery should also support the development of attributes which encourage job readiness of graduates.* (Submission: QICTLG)

> *The concept of 'project management' is a great leap forward, an excellent addition and mirrors both the learning process and the processes used in real industry. Well done.* (Survey: Individual, Queensland)

Respondents noted the inclusion of terminology to foster exploration in the early years, such as ‘playfulness’ and ‘hands-on’ approach. This was perceived as a strength of the Nature of the technologies area section as it would encourage a positive view of technology which is more likely to lead to early adoption and integration of Technologies learning.

> *It was felt that the focus on 'playfulness' and 'hands on' approaches in exploration of technology in the early years would help to promote a very positive view of technology in later years of learning.* (Submission: SADECD)

> *Extremely pleased to see reference to hands-on exploration here as well as the inclusion of the influence of personal and family settings.* (Survey: Organisation, Victoria)

> *APPA is pleased to see that critical thinking, creativity and engagement are highlighted in this section. Also, in the primary school setting most, if not all, classrooms adopt an integrated approach to learning and Technologies would be well recognised as supporting this approach.* (Submission: APPA)

Matters for improvement

Again, while many respondents indicated their agreement with the content and scope of the Nature of the Technologies learning area, the recurring areas of concern focused on the complexity of the language, repetition and the length. This was particularly noted in the written submissions. There was also a request for linkages to be made between Digital Technologies and Mathematics and Science.

> *The generalised approach also leads to excessive repetition of ideas within the Shape Paper. The sections that provide information about the learning area as a whole [Paragraphs 30–57] use illustrative examples from the strands/subjects. However, the sections that address the unique characteristics of both Digital Technologies and Design and Technologies are structured in exactly the same way and are also general in nature [Paragraphs 58–65, 66–72]. Consequently, there is significant overlap in content across all of these sections with a high level of abstraction and repetition.* (Submission: AEF)

> *ACDICT would hope that national curriculum discussions will ensure that there will be suitable linkages from ICT to maths and science curricula.* (Submission: ACDICT)

Respondents called for the definition of the term 'computational thinking' to be reviewed to clarify it as an approach to problem analysis and solving rather than the implied strong link to computer processing and programming.

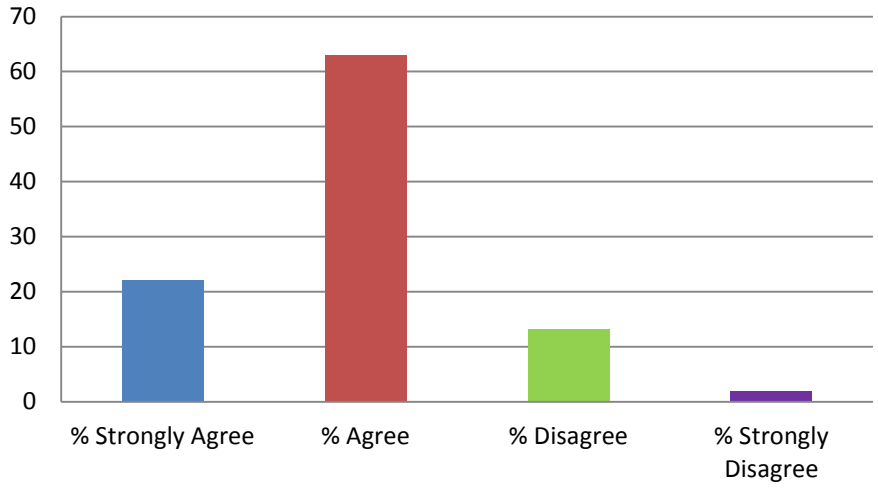
> *Concerns about the term 'computational thinking'. Being a teacher of computing I understand the term but if I was from a non-computer background I would have difficulties understanding this type of thinking, especially if I was teaching F–6.* (Survey: Individual, NSW)

3.5 Aims of the Australian Curriculum: Technologies

The Aims area in the draft Shape of the Australian Curriculum: Technologies paper outlined the aims of the content, the type of thinking fostered, and student characteristics to be developed.

Question 14: The Aims make clear the intended learning for students in the Australian Curriculum: Technologies.

Fig. 9: Responses to Question 14 – Aims



Key strengths

In response to question 14, 85 per cent of online respondents 'strongly agreed' or 'agreed' with the ways in which the Aims were expressed. The positive feedback overwhelmingly indicated that the Aims were coherent and clearly encapsulated the position of the Technologies learning area in fostering active and informed citizens. This was supported by the written submissions.

> *The Aims overall appear clear and coherent, well expressed* (Survey: Individual, Victoria; NSW x 4; WA; Submissions: QCEC; NTDET; SADECD; HEIA)
>
> *The real strength of the aims lies in their clear connection to the Melbourne Declaration.* (Survey: Individual, Queensland)
>
> *The focus on ethics and sustainability made clear.* (Survey: Individual, WA)

Matters for improvement

While the feedback was clearly favourable, several suggestions were made by respondents to strengthen the aims. Examples of the suggestions received include:

> *Although we agree with the aims, we are concerned there is too much emphasis on critical analysis, project management and higher order thinking in the primary years.* (Survey: Individuals, NSW)
>
> *Lacks reference to developing students who have a knowledge of and ability to analyse/critique historical and contemporary design approaches/culture.* (Survey: Individual, Victoria)

It isn't clear in the aims that it is intended that students are producers and innovators of technologies as well as users (as per Paragraph 17).

Our collective view is that the aims and objectives are worthwhile and that the challenges are surmountable provided the curriculum framework allows for the solutions to be developed. (Submission: Bond University)

3.6 Structure of the Australian Curriculum: Technologies

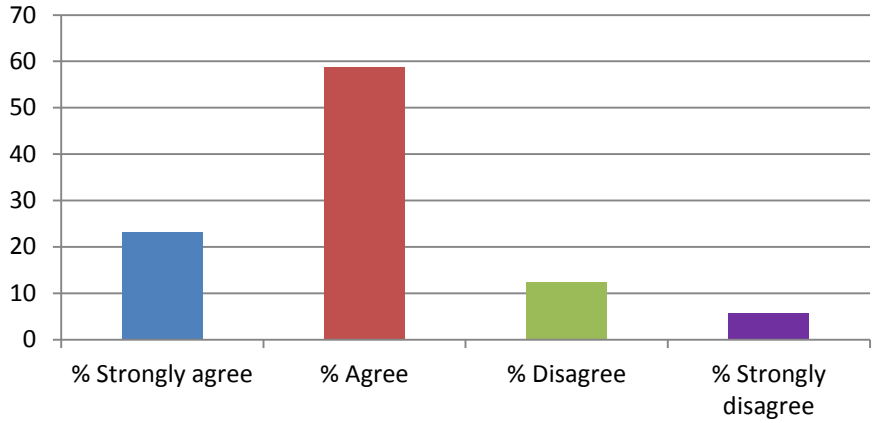
Feedback on the Structure of the Australian Curriculum: Technologies section is organised into the following sections to adequately report on all components:

- Overarching idea
- Strands: Foundation to Year 8
- Design and Technologies sub-strands: Foundation to Year 8
- Digital Technologies sub-strands: Foundation to Year 8
- Subjects: Years 9 to 12
- Design and Technologies sub-strands: Years 9 to 12
- Digital Technologies sub-strands: Years 9 to 12.

Overarching idea

Question 15: The overarching idea of 'Engaging in creating preferred futures' for both Design and Technologies and Digital Technologies is appropriate for a 21st century Technologies curriculum.

Fig. 10: Responses to Question 15 – Overarching idea



Key strengths

In response to question 15, 82 per cent of online respondents supported the overarching idea of the Technologies curriculum as an opportunity for students to directly engage in creating preferred futures. The concept of engaging in creating preferred futures was strongly supported in both online survey responses and written submissions. The following education authorities provided the following supporting comments in their submissions:

Commend the use of overarching idea, may need more unpacking regarding teaching implications of 'preferred Futures'. See importance in integrating strands as this is common to Design technologies and Digital Technologies. (Submission: QCEC)

> *SADECD fully supports Curriculum: the overarching idea Technologies, incorporates that the students Australian developing knowledge, understanding and skills in engaging and relevant contexts with a focus on creating preferred futures. This aligns well with the SACSA Essential Learning element of 'Futures' in which students are encouraged to critically preferred futures. The idea that we can 'create preferred futures' links the Design and Digital Technologies areas of the document together and also encourages students to be forward thinking in their approaches to solving problems, requiring them to think both in the short and long term.* (Submission: SADECD)

Other responses included:

> *Strong support for the concept of 'preferred futures', and that the future cannot be predicted but preferred futures can be envisioned and created.* (Submission: HEIA)

> *It is encouraging to see that economic, environmental and social sustainability has been taken into account in this section.* (Survey: Individual, NSW)

> *Allows for a discussion of values – 'what do we want our future to be, and how can Technologies help us achieve that?' – can raise issues of equity, access, priorities, our interaction with the environment, whose future? etc.* (Survey: Organisation, Victoria)

Matters for improvement

Again, while many respondents indicated their agreement with the overarching idea, the recurring areas of concern focused on the need for an explicit definition of the term 'preferred futures' and the varied interpretations and scope that such a broad overarching idea may present for teachers. Similar feedback was indicated in the written submissions.

> *Some concern that the focus seems a little too focussed on 'solving big world problems' rather than allowing students the scope for individual creativity - free of constraints etc.* (Survey: Individual, NSW)

> *Victoria is not advocating the inclusion of 'Engaging in preferred futures' (paragraphs 33, 52 and 53) as an overarching idea. 'Engaging in creating preferred futures' is wishful rhetoric and it implies that we all have a shared view about the future. There is conjecture about whose future, and who has the rights and responsibilities to determine the nature of it; neither is exclusively the domain of the technologies curriculum. Opportunities exist within this learning area to consider how our use of resources and technology can affect our environment, economy and society and of innovative ways of approaching and producing technological solutions.* (Submission: VIC)

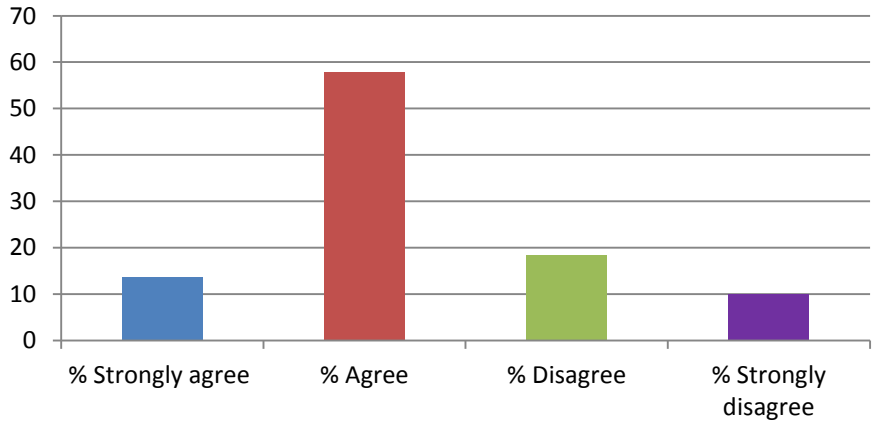
Strands: Foundation to Year 8

Learning in the Technologies learning area from Foundation to Year 8 is organised through two strands: Design and Technologies and Digital Technologies.

Questions 16 to 24 focus on the strand and sub-strand structure proposed for each of Design and Technologies and Digital Technologies.

Question 16: From Foundation to Year 8 the two strands: Design and Technologies and Digital Technologies provide an appropriate structure for writing the Technologies curriculum.

Fig. 11: Online survey responses to Question 16 – Strands



Key strengths

In response to question 16, 72 per cent of online respondents supported the proposed structure of strands from Foundation to Year 8. This contrasts with the 65 per cent of survey respondents who 'strongly agreed' or 'agreed' that the proposed structure as described was appropriate for the development of the Technologies curriculum in the Key considerations section.

> *Very pleased that the national curriculum recognises the importance of every child experiencing Design and Digital Technologies from Foundation to the end of year 8, with the acknowledgement that students from year 9 through to 12 will desire to establish their own pathways and hence reserve the right to have choices.* (Survey: School, Tasmania)

Written submissions from a number of state and territory curriculum authorities and professional teacher associations also indicated support of the proposed structure:

> *The ability to integrate the two strands in teaching and learning programs in F–8 is strongly supported by TiPS. The recognition that 'integration is central pedagogy found in the early years, and a key strength for meaningful learning in the Technologies curriculum' is also supported by TiPS.* (Submission: TiPS)

> *Teachers representing the Early Years and Primary on the SADECD advisory group were enthusiastic about the flexibility to choose between integration of the two strands or teaching each discretely ...* (Submission: SADECD)

Matters for improvement

In response to question 16, 28 per cent of online respondents 'disagreed' or 'strongly disagreed' with the structure of the strands from Foundation to Year 8. There were concerns that the nomenclature was not clear and that there was not a clear difference between the two strands. This was also reflected in a number of written submissions.

> *The difference between Digital Technologies and design and technologies seems to be blurred, it is not clear.* (Submission: AISWA)

WA primary teachers integrate related curriculum content from more than one learning area so the question they have relates to how the Digital Technologies and Design and Technologies understandings and processes are different and how they are similar. (Submission: WA)

The Technologies learning area is divided into strands/subjects then sub-strands. This use of the terms 'strand' and 'sub-strand' are not consistent with previously developed learning areas. What is referred to as a 'sub-strand' here would be a 'strand' for example, in English, history, mathematics, science, or geography ... A consistent approach to structural terminology across the Australian Curriculum is important for communication both about the learning area and the Australian Curriculum as a whole, and is drawn to the attention of ACARA. (Submission: AEF)

The Design and Technologies strand in F–8 does not do justice to the breadth of learning that is typically offered in schools across numerous contexts currently under the broad heading of 'Technology'. A number of schools, for example, pride themselves on the rich learning they offer students through an agricultural science context. (Submission: QLD)

Design and Technologies sub-strands: Foundation to Year 8

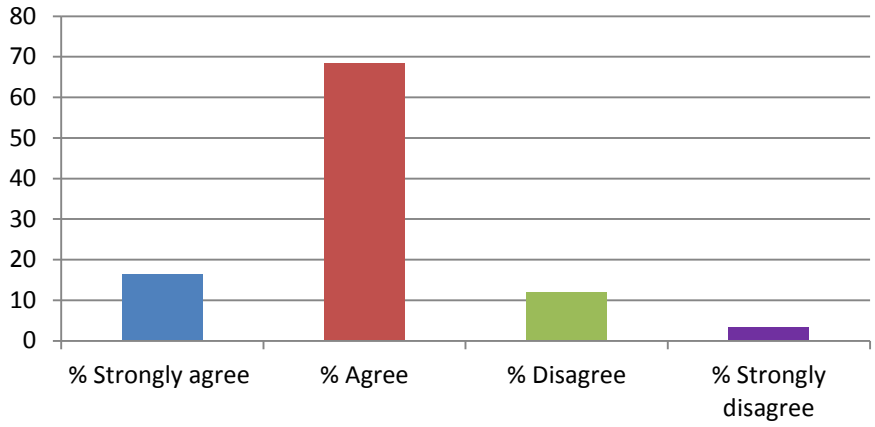
Learning in the proposed Design and Technologies strand from Foundation to Year 8 is organised through two sub-strands: Knowledge and understanding and Processes and production.

Question 17: From Foundation to Year 8 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies.

Question 18: From Foundation to Year 8 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Design and Technologies.

In response to question 17, 85 per cent of online survey respondents 'strongly agreed' or 'agreed' that from Foundation to Year 8 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies. Similarly, 82.4 per cent of online survey respondents indicated that the two sub-strands provided a useful structure for developing teaching and learning programs for Design and Technologies. This was also reflected in the written submissions.

Fig. 12: Online survey responses to Question 17: Sub-strands Design and Technologies F–8



Key strengths

Support for the sub-strands was reflected in both the online survey responses and submissions.

> *Support the distinction made between the strands ' Design and Technologies knowledge and understanding' and ' Design and Technologies processes and production – design, process and evaluate' ... and commend the authors of the draft for an intellectually coherent design which recognises the underpinning of the development of artefacts by an understanding of context and tools.* (Submission: ACS)

Matters for improvement

Although there was strong support there were matters for improvement focused particularly on doing justice to the breadth of the learning area and the articulation of the technologies contexts. There were also concerns about the separation of theory and practice.

> *Given the time constraints, there needs to be a more clearly defined specification of the contexts for learning. Some have suggested the need for defining subjects within the design and technologies strand. The breadth that is described in the paper may lead to superficial engagement in an array of contexts.* (Submission: AISWA)

> *A traditional problem in this learning area has been the separation of theory and practice in schools (through pedagogies, exams and facilities) whereas it is actually not possible to separate them if either is to be effective. The proposed sub strand structure perpetuates the perception that there is a separation. Although it has long been stated that they are integrated, their separation in curriculum documentation attests otherwise. please develop some sub-strands that broach the theory-practice divide and so present this subject as one in which thinking and doing are inextricably entwined.* (Survey: International)

> *The separation of the sub-strands leads to disjointed and impractical teaching and learning programs that will not necessarily serve the needs of students as described in the introduction.* (Survey: Individual, Queensland)

Digital Technologies sub-strands: Foundation to Year 8

Learning in the proposed Digital Technologies strand from Foundation to Year 8 is organised through two sub-strands: Knowledge and understanding and Processes and production.

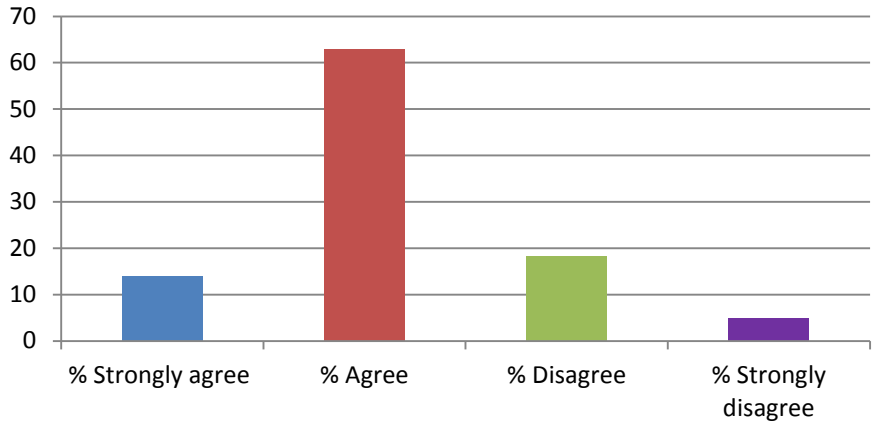
Question 19: From Foundation to Year 8 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Digital Technologies.

Question 20: From Foundation to Year 8 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Digital Technologies.

In response to question 19, 77 per cent of online survey respondents 'strongly agreed' or 'agreed' that from Foundation to Year 8 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Digital Technologies.

Similarly, 74 per cent of online survey respondents indicated that the two sub-strands provided a useful structure for developing teaching and learning programs for Digital Technologies. Similar feedback was received from the written submissions.

Fig. 13: Responses to Question 19 – Sub-strands: Digital Technologies F–8



Key strengths

A key strength identified for the sub-strands for Digital Technologies was that having sub-strands in common with Design and Technologies provided coherence across the learning area and aided integration of learning in particular in the primary years.

> *Clear, coherent structure. Positive that the Digital Technologies sub-strands have the same names as those for Design and Technologies. Same names provide learning area coherence.* (Submission: HEIA)

Matters for improvement

A number of matters for improvement were identified for the sub-strands for Digital Technologies. They included a concern that the strand structure 'creates an unnatural separation between what are blended processes'; that Digital Technologies seems to be

focused on ‘computer programming and does not take into account other areas’ and that there was an absence of design in Digital Technologies.

> *QSITE disagrees with the selection of the sub-strands. While they may fit Design and Technologies, they are not appropriate for Digital Technologies. This is because it creates an unnatural separation between what are blended processes. QSITE supports the position adopted ACCE (Australian Council of Computers in Education) where alternate sub-strands have been suggested: Understanding Networks, Environments and Contexts; and Creating Digital Solutions.* (Survey: Organisation, Queensland)

> *More emphasis needs to be made in ‘realising a product’ rather than just ‘solutions’ in the Digital Technologies strand.* (Submission: SADECD)

> *The Digital Technologies strand seems to be focused on computer programming and does not take into account other areas, such as digital production (presentation, gaming, music, podcast, photography and web).* (Submission: QLD)

> *The definitions of the 2 strands/subjects are inappropriate, especially Digital Technologies, which may be appropriate for specialist teachers in 7–12 but is not appropriate in F–6.* (Survey: Individual, NSW)

> *In Digital Technologies, data, a key element, is only mentioned once (at Years 7–8), and communications such as social media, are not specifically included. Inaccessible language, particularly with respect to computational thinking, prevents non-specialist teachers from understanding the content. As a generalisation, the pitch of the content and sequence for Years 7–10 is better than that from F–6.* (Submission: VIC)

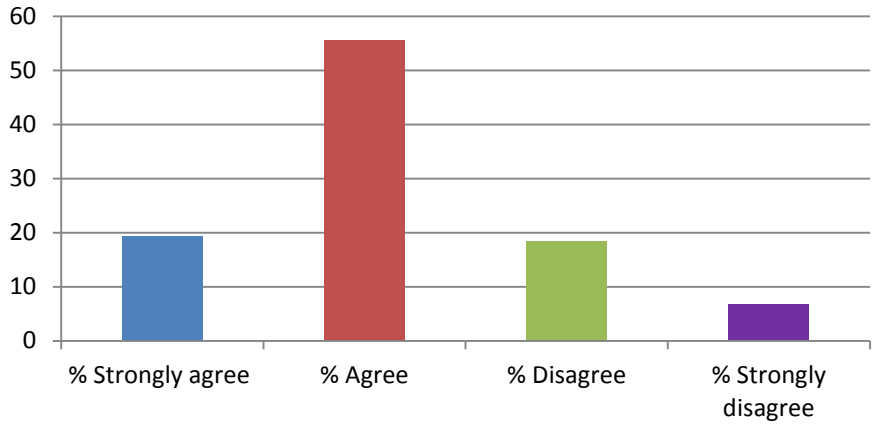
> *Design should be built into the digital technologies strand and be represented in information about both areas. Design is currently not mentioned in the digital strand.* (Survey: Individual, NSW)

Subjects: Years 9 to 12

From Year 9 to Year 12 Design and Technologies and Digital Technologies will be developed as separate subjects that students may choose to study, noting that students may also choose to study Technologies subjects offered by states and territories that complement and do not duplicate the Australian Curriculum.

Question 21: From Year 9 to Year 12 the two subjects: Design and Technologies and Digital Technologies provide an appropriate structure for writing the Technologies curriculum.

Fig. 14: Responses to Question 21 – Subjects



In response to question 21, 75 per cent of online respondents supported the proposed structure of subjects from Years 9 to 12. This contrasts with the 65 per cent of respondents who 'strongly agreed' or 'agreed' that the proposed structure as described was appropriate for the development of the Technologies curriculum in the Key considerations section.

Key strengths

A key strength was the flexibility provided by the two subject structure and the options for other electives to be continued to be offered by states and territories.

> *Very pleased ... with the acknowledgement that students from year 9 through to 12 will desire to establish their own pathways and hence reserve the right to have choices.* (Survey: School: Tasmania)

Matters for improvement

Although there was strong support for the two subjects there were some concerns in relation to progression into senior secondary if Years 9–10 electives were not mandatory and which electives could be offered by states and territories.

> *Pleased that the strand is mandatory from F–8, we are concerned that the subject is not mandatory in years 9 and 10.* (Submission: ACS)

> *It is difficult to agree with the structure for Years 9–10 when the proposals for Years 9/10 are not clear.* (Submission: HEIA)

Design and Technologies sub-strands: Years 9 to 12

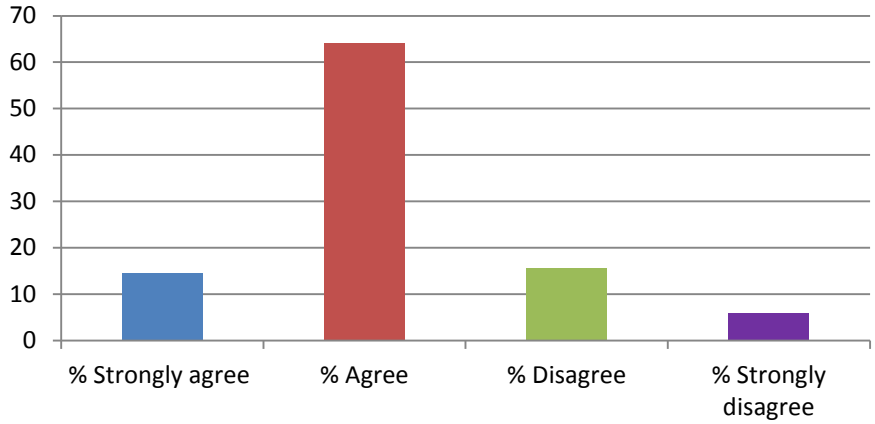
Learning in the proposed Design and Technologies subject from Years 9 to 12 is organised through two sub-strands: Knowledge and understanding and Processes and production.

Question 22: From Year 9 to Year 12 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies.

Question 23: From Year 9 to Year 12 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Design and Technologies.

In response to question 22, 79 per cent of online survey respondents 'strongly agreed' or 'agreed' that from Year 9 to Year 12 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies. Similarly, 82 per cent of online survey respondents indicated that the two sub-strands provided a useful structure for developing teaching and learning programs for Design and Technologies.

Fig. 15: Responses to Question 22 – Sub-strands: Design and Technologies 9–12



Key strengths

> *The major strength identified by both online survey respondents and written submissions was that the structure was familiar and allowed for development of curriculum and teaching and learning programs.*
>
> *From Year 9 to Year 12 the two sub-strand structure as stated above provides a useful structure for developing teaching and learning programs. Teachers at this level are familiar with technology processes so should be well positioned to use this structure for program development.* (Submission: HEIA)

Matters for improvement

Some suggestions for improvement included modifying the description of the Processes and production strand to more closely reflect the steps in a project; to specify technologies contexts and to emphasise production.

> *Although we agree with using the term 'design thinking', we still need a logical sequence for students to follow in the classroom. Therefore, the dot points in this section need to reflect what would happen when a student is given a task to complete. This also gives a framework for assessment.* (Submission: DATTA)
>
> *Given the time constraints, there needs to be a more clearly defined specification of the contexts for learning. Some have suggested the need for defining subjects within the design and technologies strand. The breadth that is described in the paper may lead to superficial engagement in an array of contexts.* (Submission: AISWA)

Digital Technologies sub-strands: Years 9 to 12

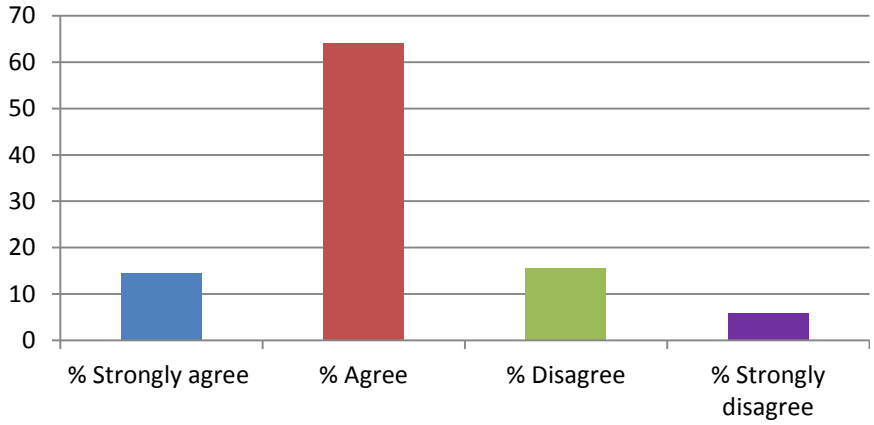
Learning in the proposed Digital Technologies strand from Years 9 to 12 is organised through two sub-strands: Knowledge and understanding and Processes and production.

Question 24: From Year 9 to Year 12 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Digital Technologies.

Question 25: From Year 9 to Year 12 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Digital Technologies.

In response to question 24, 74 per cent of online survey respondents 'strongly agreed' or 'agreed' that from Year 9 to Year 12 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Digital Technologies. Similarly, 75 per cent of online survey respondents indicated that the two sub-strands provided a useful structure for developing teaching and learning programs for Digital Technologies. This was also reflected in the written submissions.

Fig. 16: Responses to Question 22 – Sub-strands: Digital Technologies 9–12



Key strengths

A key strength identified for the sub-strands for Digital Technologies was that having sub-strands in common with Design and Technologies provided coherence across the learning area.

Matters for improvement

There were concerns by some respondents that the Digital Technologies was too focused on computer programming at the expense of digital production, conversely there were those who indicated that there needs to be more emphasis on computational thinking in the description of Digital Technologies. Other concerns included little evidence of critical and creative thinking; little emphasis on control systems and design not mentioned in Digital Technologies.

The Digital Technologies strand seems to be focused on computer programming and does not take into account other areas, such as digital production (presentation, gaming, music, podcast, photography and web). (Submission: QLD)

There needs to be more emphasis on computational thinking in the description of Digital Technologies. (Survey: Individual, Queensland)

Critical and creative thinking' is at the essence of the design process as students pose critical questions to challenge the intentions and consequences of technology in various contexts and reflect on the outcomes of their own projects. However this is not clear in the Digital Technologies strand. (Submission: SA Health)

Design process model needs to be clearly articulated. More emphasis needs to be made in 'realising a product' rather than just 'solutions' in the Digital Technologies strand. (Submission: SADECD)

3.7 General capabilities and the Australian Curriculum: Technologies

This section of the draft Shape paper outlined the relationship between each of seven general capabilities and the Technologies learning area.

Questions 42 to 49 sought responses to whether the broad description of each general capability in relation to Technologies provided appropriate direction to inform the development of the detailed curriculum.

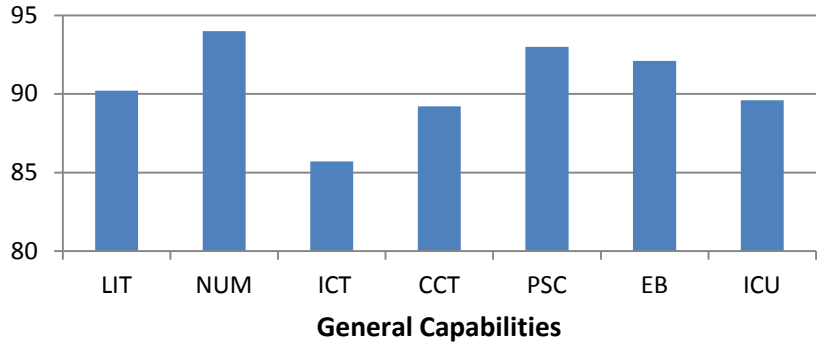
Both online survey respondents and written submissions from education authorities and professional teacher associations indicated that the broad outline of general capabilities in Technologies is appropriate. There was very strong support for most, with slightly less support for Information and communication technology capability and Critical and creative thinking.

The descriptions of how the general capabilities and cross-curriculum priorities apply to the Technologies curriculum were all generally supported in Queensland's feedback. (Submission: QLD)

Paragraph 73, the introductory paragraph is very useful because it clearly describes the relationship between general capabilities and learning areas. (Submission: WA)

Figure 17 represents the percentage of online survey respondents who strongly agreed or agreed to Questions 42 to 49: General capabilities.

Fig. 17: Percentage of responses that strongly agreed or agreed to Questions 42 to 49 – General capabilities



Literacy (LIT), Numeracy (NUM), Information and communication capability (ICT), Critical and creative thinking (CCT), Personal and social capability (PSC), Ethical behaviour (EB) and Intercultural understanding (ICU)

Literacy

In response to question 42, 90 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of Literacy provides appropriate direction to inform the development of the Technologies curriculum.

Matters for improvement

Respondents provided suggestions for further improvement including:

> *Literacy is mentioned as critical to design thinking (final sentence), but would benefit from additional detail that outlines the direct relationship of literacy in the design process.* (Survey: Individual, NSW)

Numeracy

In response to question 43, 94 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of Numeracy provides appropriate direction to inform the development of the Technologies curriculum.

Key strengths

> *ASIC was encouraged that strong links have been recognised between Technologies and Numeracy.* (Submission: ASIC)

> *This provides a clear picture of the capability and, from a primary perspective, it also brings a welcome emphasis upon literacy within the numeracy capability.* (Submission: APPA)

Matters for improvement

While there was strong support there were a number of suggestions for further improvement particularly focused on measurement and numeracy in Digital Technologies.

> *Specific mention of accuracy in measurement needed.* (Survey: VIC; ACT; Submission: DATTA)

> *This relates to applying mathematical knowledge and skills; when working with food this would involve calculating, estimations, measuring, recording and costing.* (Survey: Organisation, Victoria)

> *The use of algorithmic logic and sequencing, for example, are explicit in the elements of the Numeracy general capability. They are not mentioned in Numeracy section of the Shape Paper… This should be addressed.* (Submission: AEF)

Information and communication technology (ICT) capability

In response to question 44, 86 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of the ICT capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

Key strengths

Key strengths identified by respondents of the online survey and written submissions conflicted with some of the matters for improvement. What was clear to some was not clear to others.

> *Specialist Information teachers stated that they strongly agreed with the statement and that paragraph 80 was a good summary in that it refers to users of ICT and developers of information solutions.* (Submission: WADET)

> *The relationship between Digital Technologies and the ICT competence general capability, as framed in paragraph 80 (p. 18), seems to be a reasonable distinction in theory. Make the statement earlier in the document.* (Submission: QLD)

> *The difference between the Digital Technologies strand in this learning area and the ICT capability is addressed well [Paragraphs 76 – 80]. In particular, the summary of the relationship between the two [Paragraph 80] is a clear and excellent inclusion, strongly supported by the AEF.* (Submission: AEF)

Matters for improvement

> *Paragraphs 77 and 78 Teachers were not in agreement about the direction provided in this capability description, so it is recommended that further work be undertaken refining the statement. It is important that teachers understand that ICT skills applied across the curriculum are taught in Digital Technologies.* (Submission: WA)

> *Paragraph 80, lack of clarity about the relationship between ICT as a general capability and Digital Technologies. While there is a distinction made between users and developers as key identifiers of the differences, this does not attend to the conceptual frameworks around networks, concepts and environments in which digital solutions are created and applied.* (Submission: ACCE)

> *Digital Technologies teachers indicated that the ICT General Capability reference should be strengthened. This could partially be achieved by promoting the order of paragraph 80 in this section. There is still confusion regarding the relationship between Digital Technologies curriculum and the ICT General Capability.* (Submission: VIC)

> *This section does not provide any advice on how the ICT general capability can be demonstrated through Design and Technologies. It needs to be made clear how D&T can integrate ICTs really well both in the collaborative processes that students use (blogs, wikis etc), the investigative process to research information, the evaluation stage e.g. electronic surveys, as well as in the production of design ideas etc. Digital Technologies are used to create design solutions and are therefore intertwined and should be delivered as such.* (Submission: HEIA)

> *Primary teachers and teachers of middle school also requested greater clarification on the distinction between the ICT general capability and the digital technologies strand. This could be achieved by clearly explaining the difference between ICT 'users' and digital technology 'developers' and by providing further elaboration of the ICT general capability across curricula, from pre-primary to year 6.* (Submission: WA)

Critical and creative thinking

In response to question 45, 89 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of the Critical and creative thinking general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

Matters for improvement

Respondents provided suggestions for further improvement including:

> *Critical thinking is the mind processing that makes the design and technological stuff happen. Some where the critical thinking of diagnostic thinking needs to be included how do you go about fixing something? More importantly why did it fail in the first place? And once again reengineering is also a critical thinking process and methodology that needs to be mentioned.* (Survey: NT)

> *Higher order thinking skills – there is a constructivist approach to learning in Technologies and learning is always linked to a context. Design thinking involves higher order thinking – apart from critical and creative thinking which is mentioned, students are required to analyse, justify, reflect and evaluate. We need to be continually talking in those terms.* (Submission: DATTA)

Personal and social capability

In response to question 46, 93 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of the Personal and social capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

Matters for improvement

Respondents provided suggestions for further improvement including:

> *While primary teachers agreed with the statement they pointed out that the statements were not relevant to Early Childhood Education. The curriculum will demonstrate the link in the early years.* (Submission: WADET)

> *Social capability is developed when students collect data on the needs of the client by, for example, interviewing them or conducting surveys. Similarly when evaluating products, students should be collecting data from the client, another opportunity to develop social skills. Time management as part of project management would reinforce personal skills.* (Submission: HEIA)

Ethical behaviour

In response to question 47, 92 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of the Ethical behaviour general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

Key strengths

The strong ethical component of the Shape paper was acknowledged in a number of sections.

> *A focus on developing responsible local and global citizens. The strong ethical component in the Shape Paper echoes the emphasis in the National Consumer and Financial Literacy Framework on developing informed, responsible and ethical consumer attitudes and behaviours that will help students grow into thoughtful local and global citizens.* (Submission: ASIC)

Matters for improvement

There were some suggestions for improvement including language clarity and the inclusion of legal perspectives.

> *The legalities of working with technologies and specific approaches to cyber and information security should be given emphasis, particularly in relation to the principles of privacy and how they relate to and govern methods of data flow, data security and data transmission within and across national borders. The protection and integrity of data, individual privacies and corporate innovations are of the highest importance in the digital world.* (Submission: Defence)

> *This is a coherent paragraph which well describes the general capability as applied to Technologies. One possible inclusion could be around students being encouraged to develop the skills or discernment to detect bias, perspective and honesty.* (Submission: APPA)

Intercultural understanding

In response to question 48, 90 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description of the Intercultural understanding general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum. This section of the general capabilities received the most feedback some of which focused on learning about other cultures rather than intercultural understanding.

Matters for improvement

Matters for improvement included:

> *Consider the inclusion of students learning about and applying how to interact/communicate with diverse communities when being the designer and possibly the marketer of technologies. Further illustration of the general capability could include how students as potential designers will explore the way diverse communities view change to both the technologies and people outside their communities from a cultural, tradition and long-held attitudes, beliefs and values.* (Submission: WA)

> *In the Shape Paper, references to society and/or social sustainability as a consideration for the evaluation of digital solutions, particularly in the global context, create an impression of social homogeneity. This should be avoided in recognition of the diversity of societies and cultures that exist (for example: Paragraph 37, 49 dot point 2, etc). The term social sustainability (Paragraphs 7 and 53) needs to be explained. The use of terms such as 'societies' and 'cultures', suggesting diversity rather than homogeneity, would help address this issue.* (Submission: AEF)

3.8 Cross-curriculum priorities and the Australian Curriculum: Technologies

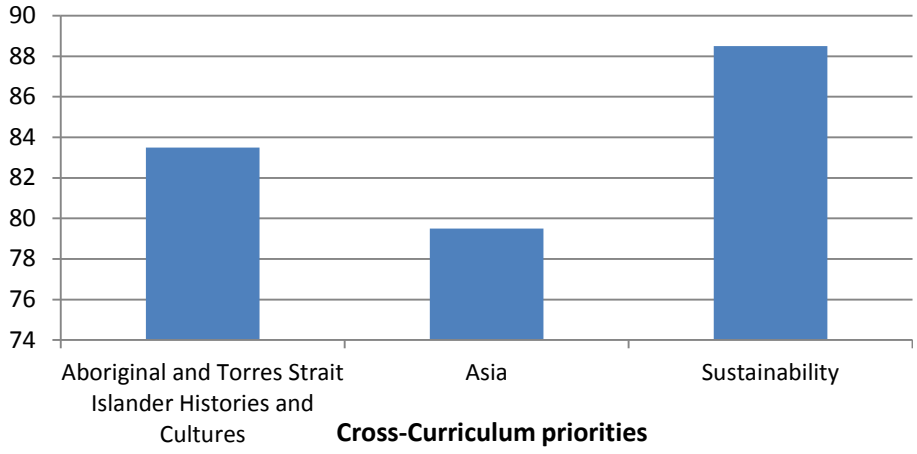
This section of the draft Shape paper outlined the relationship between each of the three cross-curriculum priorities and the Technologies learning area.

Questions 50 to 52 sought responses to whether the broad description of each cross-curriculum priority in relation to Technologies provided appropriate direction to inform the development of the detailed curriculum.

Both online survey respondents and written submissions from education authorities and professional teacher associations indicated that the broad outline of cross-curriculum priorities in Technologies is appropriate.

Figure 18 represents the percentage of online survey respondents who strongly agreed or agreed to Questions 50 to 52: Cross-curriculum priorities.

Fig. 18: Percentage of responses that strongly agreed or agreed to Questions 50 to 52 – Cross-curriculum priorities



Aboriginal and Torres Strait Islander histories and cultures

Question 50: The broad description of the cross-curriculum priority, Aboriginal and Torres Strait Islander histories and cultures, in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

In response to question 50, 84 per cent of the online survey respondents 'strongly agreed' or 'agreed' with the broad description. Written submissions from education authorities and teacher professional associations indicated this section has demonstrated a strong relationship between Technologies and this cross-curriculum priority.

Key strengths

A key strength of the broad description of the Aboriginal and Torres Strait Islander histories and cultures cross-curriculum priority was identified by participants in the National Youth Forum on the Technologies draft Shape paper:

> *Young people identified the potential use of technology to increase appreciation and respect for diversity. These included the use of communication technologies for intercultural communication in real-time and to using technology to research culture.* (Submission: NYF)

Matters for improvement

The respondents who disagreed that the broad description of the, Aboriginal and Torres Strait Islander histories and cultures cross-curriculum priority provides appropriate direction for writing the detailed curriculum indicated that:

> *… the text tends to focus on history at the expense of contemporary culture* (Submission: HEIA)

> *… the text does not make a direct connection to Technologies curriculum* (Submission: WADET)

> *… it is insufficient in terms of providing guidance for development of curriculum for Digital Technologies* (Survey: Individual, Queensland).

Asia and Australia's engagement with Asia

Question 51: The broad description of the cross-curriculum priority, Asia and Australia's engagement with Asia, in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

In response to question 51, 80 per cent of the online survey respondents regarded the broad description appropriate direction to inform the development of the detailed curriculum. Written submissions from education authorities and professional teacher associations indicated this section has demonstrated a strong relationship between Technologies and this cross-curriculum priority.

Key strengths

A key strength of the broad description of the cross-curriculum priority, Asia and Australia's engagement with Asia in relation to Technologies was identified by participants in the National Youth Forum focused on the Technologies Shape paper:

> *Excellent content is included in the section dedicated to the Asia and Australia's engagement with Asia cross-curriculum priority [Paragraphs 90–93], which goes some way to address Organising Ideas 3 and 5 in particular.* (Submission: AEF)

Matters for improvement

Respondents who indicated disagreement in relation to the broad description indicated that there was 'little exploration of the importance of Asia as one of Australia's major trading partners or how increased immigration has impacted on Australian design and production to meet the needs of an increasing multicultural population' (Survey: NSW); statements addressing the meaning of the priority to the learning area, should be strengthened (Submission: AEF).

Sustainability

Question 52: The broad description of the cross-curriculum priority, Sustainability, in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

In response to question 53, 89 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the broad description provides appropriate direction to inform the development of the detailed curriculum. Written submissions from education authorities and professional teacher associations indicated this section has demonstrated a strong relationship between Technologies and this cross-curriculum priority.

Key strengths

A key strength of the broad description of the cross-curriculum priority, Sustainability in relation to Technologies was that Sustainability is represented clearly throughout the paper.

> *This section is clearly set out and well done. The descriptions exemplify the relationship of sustainability to the learning area. It is a critical cross-curriculum priority to engage students in the debate and assess competing viewpoints in order for them to be informed about decisions they might make due to their own attitudes and values.* (Submission: HEIA)

Matters for improvement

Respondents who disagreed that the broad description of the cross-curriculum priority, Sustainability provided appropriate direction to inform the Technologies curriculum generally suggested improvements rather than disagreement with the concept. However, the relationship to Digital Technologies seems less clear than the relationship to Design and Technologies:

> *There is strong endorsement of the Sustainability Cross Curriculum Priority by all Design and Technologies respondents. The Sustainability Cross Curriculum Priority is high on the agenda of Design and Technologies teachers ... Conversely, while Digital Technologies respondents acknowledge the value of sustainability there is concern at the perceived overemphasis of this priority within the paper.* (Submission: VIC)

There were also suggestions for a more explicit link to food and fibre production in relation to sustainability.

> *If the creation of a preferred future, is to include the ability to sustainably manage the food and fibre production needs of today's generation, without compromising the ability of future generations to meet their needs for food and fibre, then the knowledge skills and understanding of how humans currently address these, is surely a requirement. We believe that the particular significance of this concern can be addressed if the sustainability cross curriculum priority is applied to the Australian Curriculum: Technologies using the field of human endeavour of food and fibre production as a context.* (Submission: NFA)

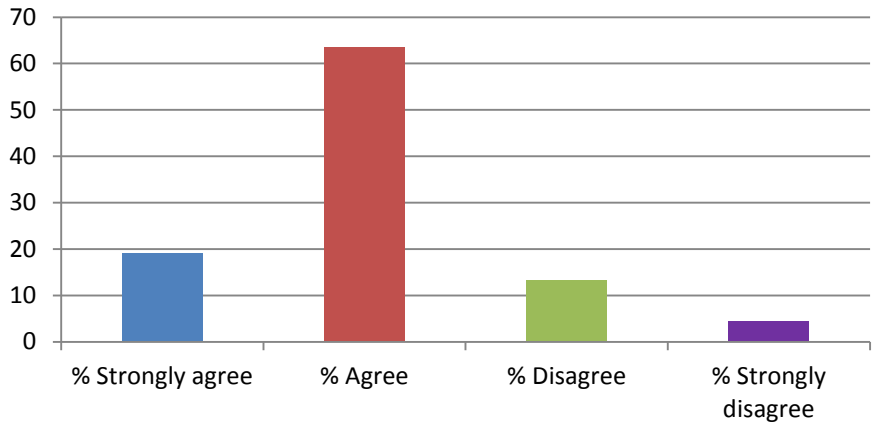
3.9 Organisation of the Australian Curriculum: Technologies

This section of the draft Shape paper outlined how the Technologies curriculum was to be organised in bands of schooling and the indicative hours that guide the writing of the curriculum.

Question 26: The organisation of the Technologies curriculum in bands is appropriate.

In response to question 26, 82 per cent of the respondents to the online survey 'strongly agreed' or 'agreed' that the organisation of the Technologies curriculum in bands is appropriate. This position was also reflected in the written submissions from education authorities and professional teacher associations.

Fig. 19: Responses to Question 26 – Organisation



Matters for improvement

A small number of submissions suggested that the Foundation Year should be separated from Years 1 and 2.

> *Primary teachers especially will have strong concerns regarding the F–2 band structure. The inclusion of Foundation within this band is considered inappropriate in the early stages of schooling where developmental change is rapid and differentiation of the curriculum is necessary.* (Submission: TiPS)

> *APPA supports the organisation of the curriculum into bands; however, the banding of Foundation to Years 1 and 2 will not necessarily meet the curriculum planning needs of the Foundation Year. It is recommended that Foundation receive its own 'band' to take better account of the developmental needs of these students.* (Submission: APPA; HEIA)

> *The bands are appropriate, however, primary teachers suggest that there is too big a jump in the child's cognitive, physical and social development from F–2. There is a need for comparable content achievement level of the two strands and across the bands of related learning areas such as science and mathematics.* (Submission: WA)

3.10 Scope and sequence of the Australian Curriculum: Technologies

This section of the draft Shape paper provided an overview of the Technologies curriculum across the years of schooling and the scope and sequence from Foundation to Senior secondary for both Design and Technologies and Digital Technologies.

The Technologies curriculum across the years of schooling

Question 27: The description and sequence of Technologies curriculum across the years of schooling is appropriate.

In response to question 27, 83 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the Technologies curriculum across the years of schooling was appropriate. There was similar support in the written submissions.

Key strengths

> *In F–2, the focus on play-based learning and recognition of children's rights to be active participants in all matters affecting their lives is viewed positively. The focus on personal forms and use of technologies in children's immediately relevant environments, such as home, aligns with other learning areas. In Years 3–6, that students progressively engage with more abstract ideas was viewed favourably. Students become more concerned with the social and environmental use of technologies, and a broadened scope of investigations to consider safe and ethical use of technologies exists, which is appropriate at this phase. In Years 7–10, the increase in independent thinking and the awareness students will develop of the interdependence of technology development, culture, environment, developer and user. The flexibility for students to undertake more specialised learning pathways in Years 9–12.* (Submission: QLD)

Matters for improvement

The main suggestion from written submissions to improve this section was to reduce the repetition with subsequent sections.

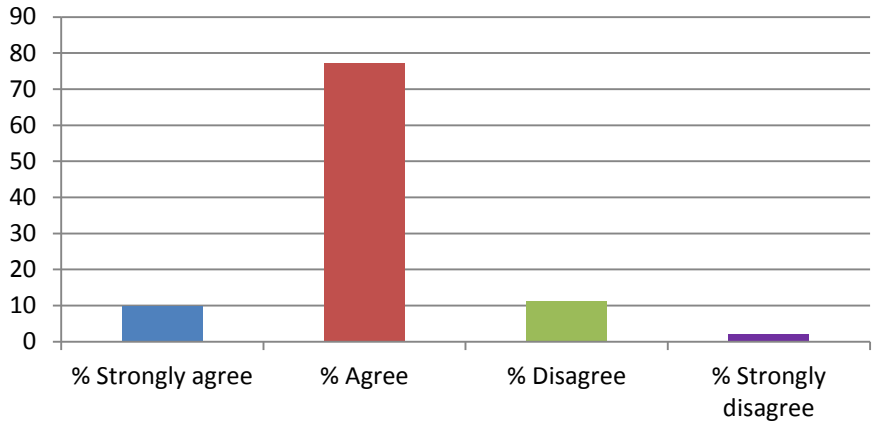
Design and Technologies across the years of schooling

Questions 28 to 34 asked whether the description and sequence of Design and Technologies learning in each band of year levels is appropriate.

Foundation to Year 2

In response to question 28, 87 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in F–2 was appropriate.

Fig. 20: Responses to Question 28 – Design and Technologies F to 2



Key strengths

The scope and sequence for F–2 was considered to capture the important features of Design and Technologies learning.

> *Paragraph 120 captures the important features of Design and Technologies learning.* (Submission: WA)

Matters for improvement

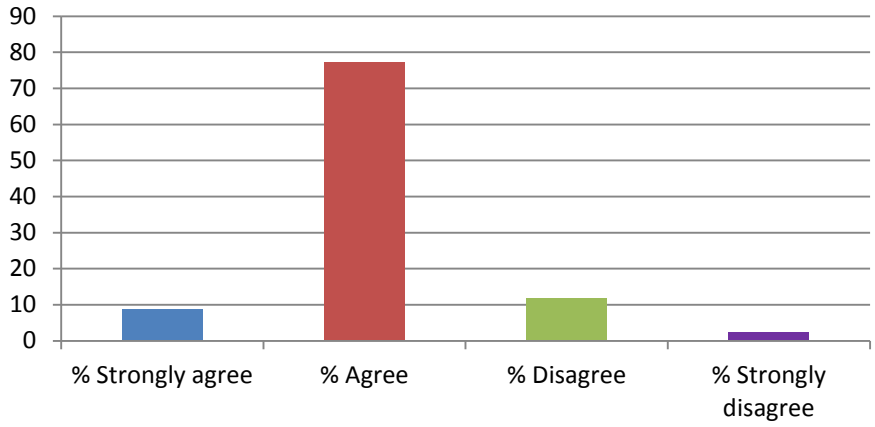
A concern was raised that the content was pitched too high for F–2 students and there should be a greater emphasis on exploring and playing in F–4 to support creativity and innovation.

> *ISQ is concerned with some of the descriptions of knowledge included in the sequence of learning – especially for students in the early years of F–4 being outside their developmental capacity.* (Submission: ISQ)

Years 3 to 4

In response to question 29, 86 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 3–4 was appropriate.

Fig. 21: Responses to Question 29 – Design and Technologies Years 3–4



Matters for improvement

In the scope and sequence for Years 3–4 there was some concern about pitch, consistency and a suggestion that there should be more emphasis on testing design ideas.

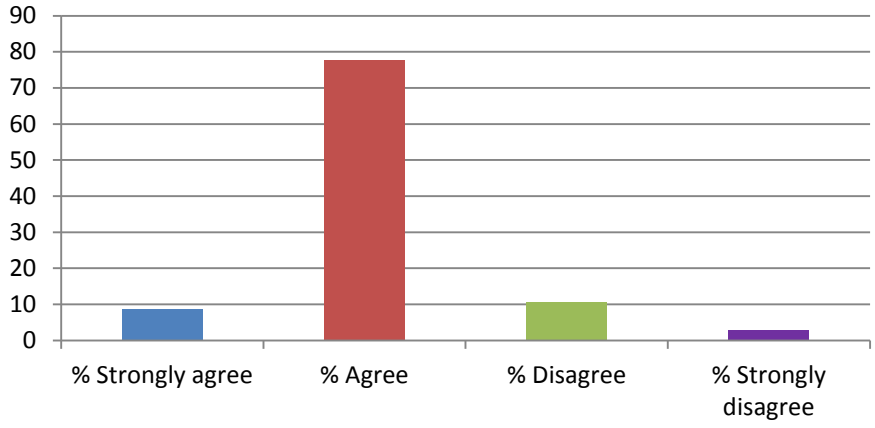
> *Years 3–6 sections of the scope and sequence do not place enough emphasis on students testing design ideas.* (Submission: QLD)

> *Inconsistency identified in paragraph 109 with reference to 'local, national and global communities' and paragraph 121 dot point 1 reference to 'local community needs'.* (Submission: WA)

Years 5 to 6

In response to question 30, 86 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 5–6 was appropriate.

Fig. 22: Responses to Question 30 – Design and Technologies Years 5–6



Matters for improvement

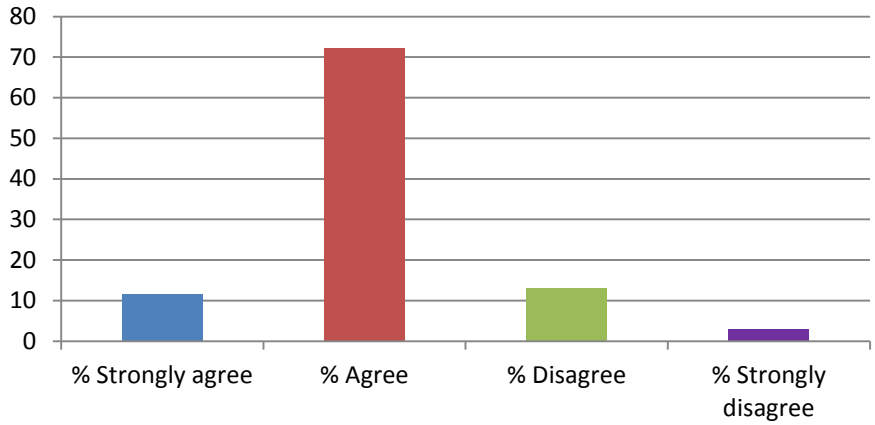
There was some concern regarding the progression of higher order thinking and evaluation from Years 5 to 6 to Years 7 to 8.

Generally agree, but in Design and Technologies, we recognised major problems with high level of thinking required at F–6 compared with 7–8 (in 3–6, many areas are more complex than at 7–8). The sequencing of some concepts through the bands isn't progressively more challenging (e.g. evaluating). There are inconsistencies in the progression of the description and sequence, notably Year 5 and 6 is more challenging that Year 7 and 8 when you critically evaluate the language used in the draft Shape paper document. These areas need to be swapped to ensure the integrity and progression of the curriculum is maintained. (Survey: Organisation, Victoria)

Years 7 to 8

In response to question 31, 84 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 7–8 was appropriate.

Fig. 23: Responses to Question 31 – Design and Technologies Years 7–8



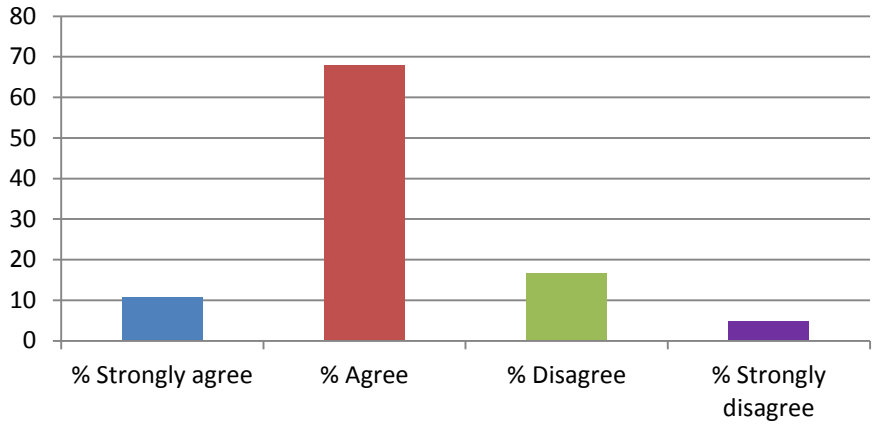
Matters for improvement

As above, there was some concern regarding the progression of higher order thinking and evaluation from Years 5–6 to Years 7–8.

Years 9 to 10

In response to question 32, 79 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 9–10 was appropriate. This was slightly less than for other bands of schooling.

Fig. 24: Responses to Question 32 – Design and Technologies Years 9–10



Key strengths

The description provided was considered easy to read and at an appropriate level.

> *Agriculture, Home economics, and Design and technology teachers commented that the description was easy to read and at an appropriate level.* (Submission: WA)

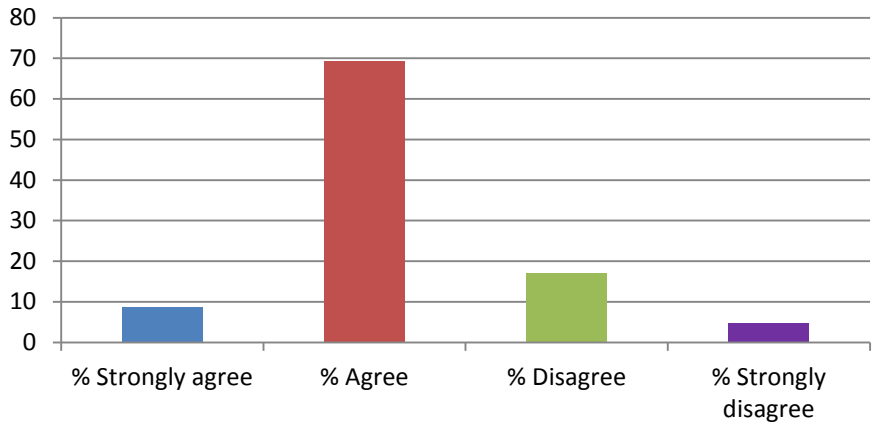
Matters for improvement

Teachers responding to this section requested more explicit and detailed descriptions and sequence of learning, however, this level of detail will be provided in the curriculum.

Senior Secondary Years

In response to question 33, 78 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Senior secondary was appropriate.

Fig. 25: Responses to Question 33 – Design and Technologies Years 11–12



Matters for improvement

There was concern expressed that the subject was optional in Years 9 to 10 and not a pre-requisite for Senior secondary. Suggestions were made to increase references to 'working collaboratively, exploring social, political and economic imperatives including legislation and

licensing requirements'. Concern was expressed that higher order thinking was pitched at a higher level in Years 9 to 10 than senior secondary years.

> *As the subject is optional in Years 9–10 students will come into Years 11–12 courses with very little knowledge or skills. Having no pre requisites lowers the expected requirements and requires further time to teach or reteach the basics. What does this say about the academic merits of our area of expertise? This will lower educational standards of students in the Technologies area.* (Submission: AISWA)

> *A scope and sequence will only work if students study in the learning area throughout the entire scope. If they study till year 8, then not 9–10, then come back to it in 11, it will not work in terms of achieving the standards necessary in years 11–12 …* (Survey: international)

> *The Years 9 and 10 descriptions seem to place greater emphasis on higher order thinking skills, with the senior secondary descriptions placing their emphasis on the depth of understanding of materials*. (Submission: QLD)

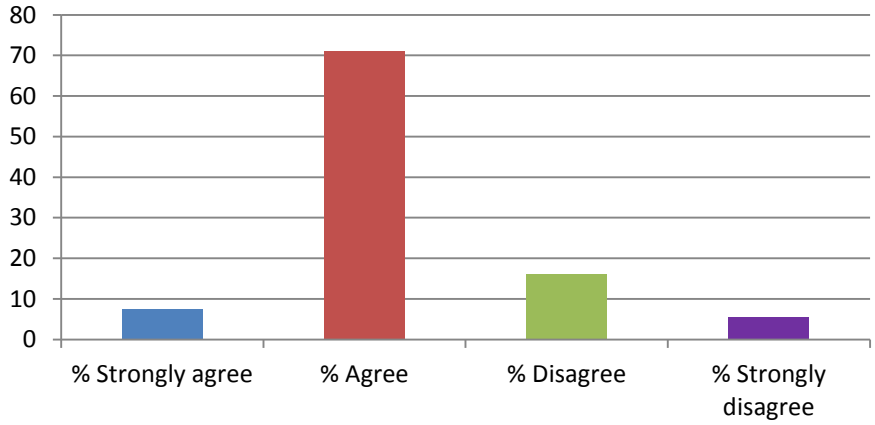
Digital Technologies across the years of schooling

Questions 35 to 41 asked whether the description and sequence of Digital Technologies learning in each band of year levels is appropriate.

Foundation to Year 2

In response to question 35, 78 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in F–2 was appropriate.

Fig. 26: Responses to Question 35 – Digital Technologies Years F–2



Matters for improvement

While there was a high level of support there were some concerns about digital technologies in the primary years. Some respondents did not agree with the extra focus on digital technologies as opposed to ICT capability across the learning areas. References to computational thinking within the Digital Technologies strand was perceived as complex. Many indicated that teachers F–6 would require extensive professional development in order to teach the content as described. Conversely, some respondents indicated that the content for F–2 reflected low expectations.

References to computer programming within the Digital Technologies strand was perceived as complex and difficult and may be beyond the capacity of K-6 teachers. (Survey: Individual, NSW)

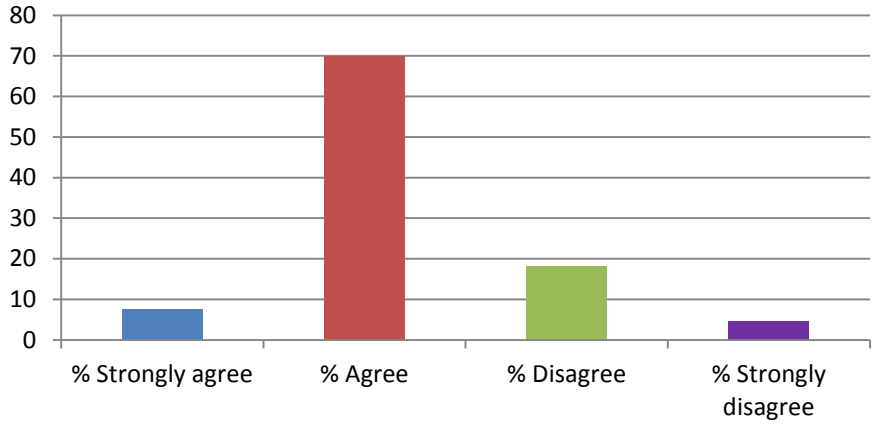
The F–2 years in the proposed scope and sequence appears to reflect low expectations relative to what young students are capable of. Sections 120 and 127 needs to include teaching a basic understanding of how technologies work. Children as young as 2 are using advanced technologies such iPods and come to school with a range of experiences in using technologies. (Submission: SA Health)

Children can design, develop and imagine simple solutions to problems. Those problems might involve the negotiation of a maze through prediction and programming or they might involve the development of multimedia, rich text e-books. (Submission: ICTEV)

Years 3 to 4

In response to question 36, 77 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 3–4 was appropriate.

Fig. 27: Responses to Question 36 – Digital Technologies Years 3–4



Matters for improvement

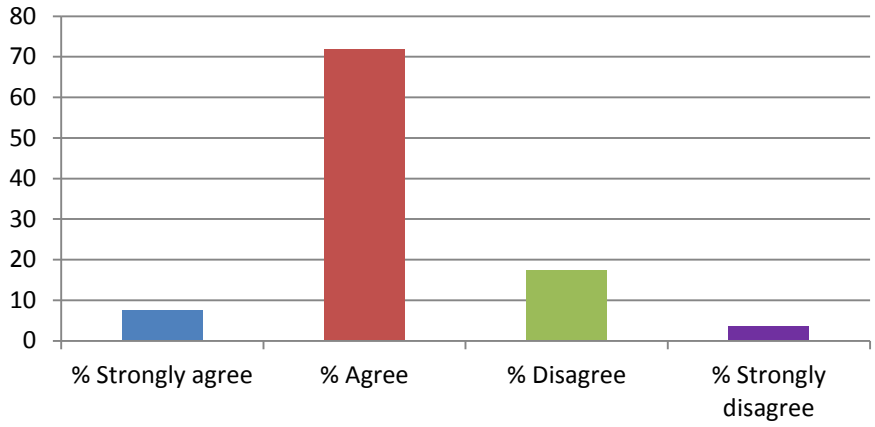
It was suggested that concepts such as digital security, personal safety and the ethical use of digital technologies should be included earlier in the scope and sequence. It was noted that computational thinking will be a new term to teachers and that it should be included in the glossary.

Computational thinking is a new term to primary teachers which highlights the importance of glossary. (Submission: WA)

Years 5 to 6

In response to question 37, 79 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 5–6 was appropriate.

Fig. 28: Responses to Question 37 – Digital Technologies Years 5–6



Matters for improvement

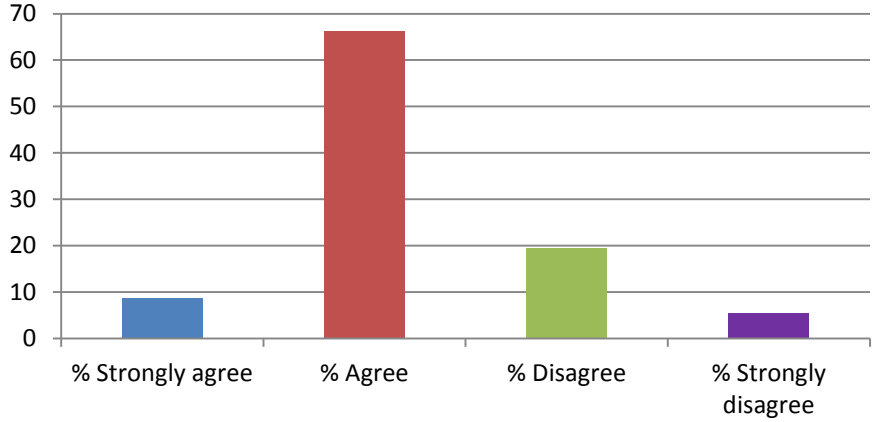
The technical language in this section of the scope and sequence was considered as inaccessible for primary teachers.

> *Dot point 3, identify the components of local systems and explain their function… and control using linear and looping sequences of instruction was not understood by primary teachers. The curriculum needs to be clear, same comments as above. Secondary teachers agree, but only if students have received a good foundation in years F–4.* (Submission: WADET)

Years 7 to 8

In response to question 38, 75 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 7–8 was appropriate.

Fig. 29: Responses to Question 38 – Digital Technologies Years 7–8



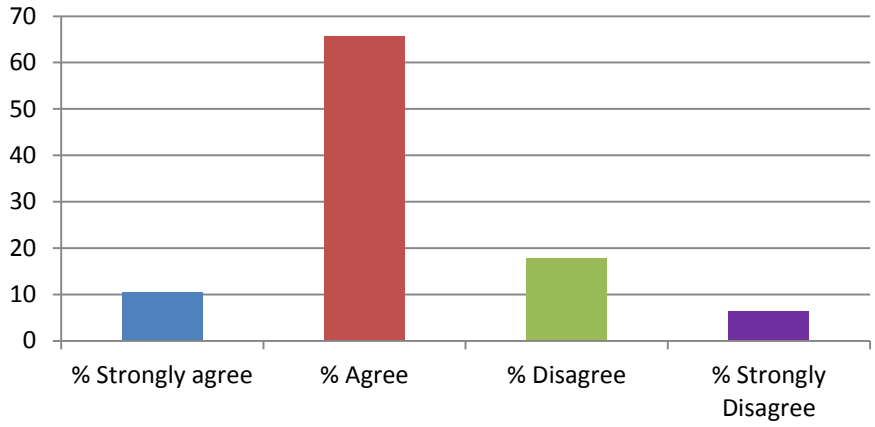
Matters for improvement

There were concerns that some points were unrealistic expectations for this band of schooling.

Years 9 to 10

In response to question 39, 76 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Years 9–10 was appropriate.

Fig. 30: Responses to Question 39 – Digital Technologies Years 9–10



Matters for improvement

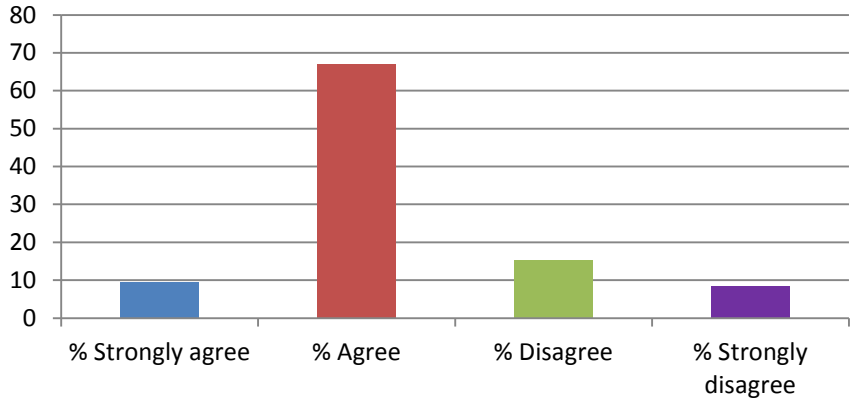
There was a concern that the paragraphs implied programming but were not sufficiently explicit. A general concern expressed in one submission, which relates to the whole scope and sequence for Digital Technologies, was a lack of focus on personal digital devices (PDD).

> *What the draft lacks is a sense of the [personal digital device] PDD as a tool to think with, an amplifier of human thought. The PDD has the potential to be embedded deeply in education and to help change the way we understand education. There are references to this idea but the draft should reflect this more strongly. The concept of being developers needs more emphasis so that we can justify the concept of intellectual rigour.* (Submission: Individuals)

Senior Secondary Years

In response to question 40, 76 per cent of online survey respondents 'strongly agreed' or 'agreed' that the description of the sequence of learning in Senior secondary was appropriate.

Fig. 31: Responses to Question 40 – Digital Technologies Years 11–12



Matters for improvement

As for Design and Technologies concern was expressed that the subject was optional in Years 9 to 10 and not a pre-requisite for senior secondary and much of what is written is too general to provide clarity.

Much of what is written in the Years 11 and 12 sections is too general to appreciate what 'subjects' ACARA intends to offer in the senior secondary years … (Submission: QLD)

3.11 Key terms

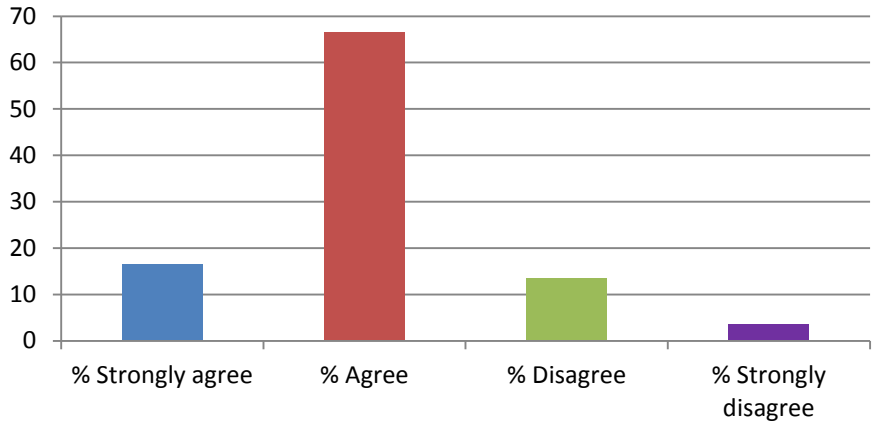
This section of the draft Shape paper provided a list of terms from the paper with descriptions of how they are proposed to be used in the Australian Curriculum: Technologies.

Question 52: The Key terms are described clearly.

Question 53: The descriptions are appropriate for the learning area.

In response to question 52, 83 per cent of the online survey respondents 'strongly agreed' or 'agreed' that the Key terms are described clearly and 80 per cent 'strongly agreed' or 'agreed' that the descriptions are appropriate for the learning area.

Fig. 32: Responses to Question 53 – Key terms



Key strengths

Most respondents indicated that the key terms were clear and appropriately described.

The descriptions are ambitious so allow for range and diversity in technologies, when designing for new programs, skills and interests. (Submission: NT)

All seemed satisfied with the key terms. (Submission: DATTA)

Most are clear and concise. (Submission: HEIA)

Matter for improvement

The most frequently noted concerns in this section were the need to include a broader range of terms and to write the terms in plain English. A number of additional terms were requested.

If the Key Terms provided in this Shape Paper form the basis of the same in the curriculum document then it is important that there is a much broader and more comprehensive listing. It is also important that the descriptions should be clear and concise. The description for 'digital information' for example is steeped in technological jargon. Many other descriptions are similarly jargon laden and confusing. (Submission: APPA)

3.12 Bibliography

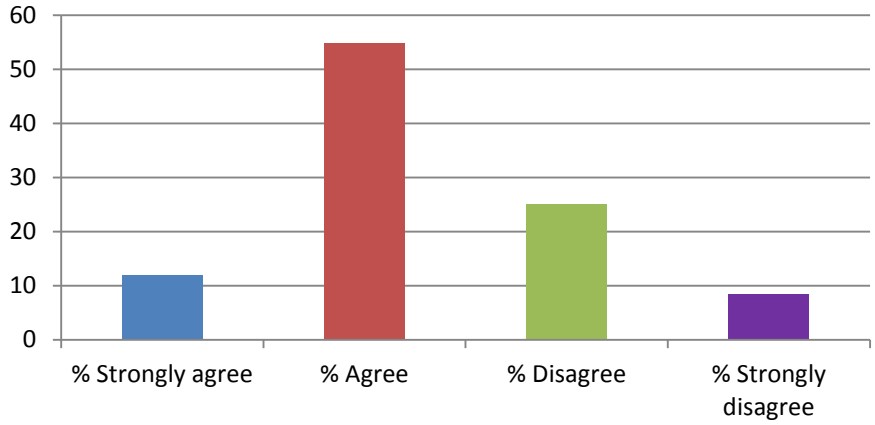
There was only one comment regarding the Bibliography requesting a more detailed version to be provided.

3.13 Overall directions

Question 55: The overall directions proposed in the Draft *Shape of the Australian Curriculum: Technologies* papers are appropriate.

In response to question 55, 67 per cent of online respondents 'strongly agreed' or 'agreed' that the overall directions proposed in the Technologies Shape paper were appropriate. This section had lower support than other sections and aligned quite closely with the responses to the Key considerations. The comments in this section were broad ranging and often included statements of support followed by 'if the following changes are made'.

Fig. 33: Responses to Question 55 – Overall directions



Key strengths

Respondents from the online survey and written submissions endorsed the general direction, intent and focus of the Draft Shape paper for Technologies indicating that it provided flexibility and a futures focus. There was acknowledgement of and support for the development of two strands/subjects.

> *… the Draft Shape Paper … is broad and flexible enough to give scope for Design and Technologies subjects and Digital Technologies. It caters for the broad range of school locations and settings, and their students.* (Submission: SADECD)

> *The Draft Shape Paper provides the intellectual rigor and sound broad base of technologies for curriculum writers to work from.* (Submission: NT)

> *We endorse the direction of the curriculum which proposes to develop young people with the skills and knowledge to confidently use and create digital environments while being cognisant of the fact that technology does not work independently of the broader community and global contexts*. (Submission: ITIIC)

Matters for improvement

This section included a broad range of concerns that respondents had generally raised earlier in other sections, including insufficient attention to agriculture and horticulture, electronics, engineering, food and nutrition, data and communications and programming; greater focus on emerging technologies needed; overemphasis on digital technologies; limited indicative hours for writing. Suggestions were also provided regarding improvements to the structure of the paper, increasing the number of key terms and highlighting the enjoyment that students gain by designing and producing in the Technologies learning area.

> *The document gives insufficient attention to agriculture and horticulture, and engineering in Design and Technologies, as well as data and communications in Digital Technologies.* (Submission: VIC)

> *The critical issue of digital literacy and ICT general capabilities has been diminished through the over emphasis on digital technologies by having two strands within the Technologies curriculum. This will have the impact of limiting the time available to engage in computational thinking in the context of all technologies and for some mastery to be developed of the technologies as a whole.* (Survey: Organisation, NSW)

> *Where is it highlighted regarding the joy in creating something that one can be really proud of; something that is useful … Students gain great satisfaction from completing technical, complex and purposeful products.*
> (Survey: Organisation, NSW)

4. Key issues and actions

The following issues were consistently raised in the consultation feedback by a broad range of stakeholders. ACARA's response to each issue is summarised in Table 3 below.

Table 3: Key issues for response

Issues	ACARA's response
Structure • While there was support for the two strands F–8, there were concerns around nomenclature and the clarity between subjects, strands and sub-strands. • Submissions from Victoria and ACCE, and other responses, proposed an alternative structure of two subjects from Foundation. While most argued that separation was required in order to maintain the identity of computing, an alternative and compelling argument was that in the attempt to write generically it makes it difficult to be specific as even though there are parallels and overlaps, they are very distinct areas in their own rights. • ACCE and Victoria proposed a name change for Digital Technologies to Computing and digital technologies. Other responses proposed different titles including a return to ICT. • There was no support for the change in name from the Technologies Advisory Group and little support from the Technologies National Panel as 'Computing' limited the focus of the subject, was dated and brought with it unnecessary negative connotations. It was argued that Digital Technologies provided a fresh and more dynamic start for the subject.	• Change the structure to two subjects from Foundation • The title for the subject will remain. • The computing aspects of Digital Technologies will be highlighted in the curriculum content.
• Victoria proposed an alternative strand/sub-strand structure: Each subject to have its own set of aims and concepts (or overarching ideas) Design and Technologies to have two strands: – Investigating, designing and planning – Producing and evaluating Three sub-strands: – Food and fibre production (agriculture and horticulture) – Materials and products (wood, food, plastic, metal, textiles) – Engineering systems (mechanical, electronic and controlled) Computing and digital technologies to have two strands: – Creating digital solutions – Networked environments Two sub-strands for the 'Creating digital solutions' strand: – Using software – Developing software.	• The learning area will have a rationale and broad aims. Each subject will have its own rationale and aims. The overarching idea for the learning area will be reflected in each subject. • The strand structure in each of the two subjects will be: – Knowledge and understanding – Processes and production skills During the writing process consideration will be given to whether organisation by strands is necessary and/or

Issues	ACARA's response
• The alternative strand structure was not supported by the Technologies Advisory Group or the majority of the National Panel. • There was strong support for a common strand structure as it allows for easier integration of the two subjects by schools.	whether different strands are more appropriate. • The sub-strands proposed will be considered as through lines or threads in each strand.
• Concerns were raised particularly from NSW respondents suggesting that separate processes for the two strands/subjects created a false distinction between the strands and that the design process was an appropriate common process across all aspects of technologies.	• The technologies contexts have been re-framed to allow for integration between subjects if desired. This will be further exemplified through elaborations.
Agriculture in the Australian Curriculum • Submissions from agriculture organisations indicated that references to agriculture (food and fibre production) were insufficient. They also requested the creation of an elective subject for Agriculture. • There was some concern from National Panel members regarding the addition of another elective as it may de-value other state and territory electives.	• Strengthen references to agriculture as food and fibre production. • Include a paragraph on how food and fibre production is addressed in the Australian Curriculum. • Propose the inclusion of food and fibre production elaborations from F–10 in Design and Technologies.
Food and nutrition in the Australian Curriculum • Submissions from health, nutrition and home economics organisations indicated that the references to food needed to be strengthened and a statement regarding the relationship between Technologies and Health and Physical Education (HPE) was needed.	• Strengthen references to food, nutrition and health in the Shape paper and include a paragraph explaining the relationship to HPE and other learning areas.
Difference between ICT general capability and Digital Technologies curriculum • 86 per cent of respondents supported the statement about ICT capability and 72 per cent understood the difference between the capability and the curriculum. However, there is still some confusion and some exemplification may be needed, including specific text about Design and Technologies.	• Revise text to address issues raised. • Additional paragraph to be added to make clear the relationship to Design and Technologies.

Issues	ACARA's response
Technologies contexts • Technologies contexts – a range of issues about the nature of the technologies contexts were raised. These include a rationale for the technologies contexts identified; concerns relating to the number, treatment, appropriateness and classification; and how the contexts might be used to deliver the curriculum.	• Improve the clarity of references to the technologies contexts. (See Key terms and Scope and sequence.)
Organisation of the learning area • Clarity around the electives offered by states and territories was needed. • There was substantial negative feedback about the indicative hours for writing.	• Revise statements relating to electives.
Repetition in and clarity of the paper • While there were a number of respondents who described the paper as clear and coherent there were others who found it difficult to navigate, repetitive, including technical language not appropriate for primary years' practitioners (especially in Digital Technologies).	• Revise layout to assist navigation, including revising how the curriculum can be read across bands of schooling • Reduce repetition by eliminating summary of key ideas at beginning of paper and through a professional edit • Reduce instances of technical language where possible and include definitions of additional terms as necessary.

5. Conclusion

Overall, the consolidated findings of all feedback indicate a high level of support for the directions proposed for the Australian Curriculum: Technologies in the draft *Shape of the Australian Curriculum: Technologies*.

The following propositions and features were strongly endorsed:

- the inclusion of Technologies as a learning area in the Australian Curriculum.
- the entitlement of all students to access Design and Technologies and Digital Technologies from Foundation to Year 8.
- the identification of two discrete technologies strands/subjects: Design and Technologies and Digital Technologies.
- the overarching idea of engaging in creating preferred futures in both subjects
- the scope and sequence of learning in the bands of schooling in both subjects/strands, with minor amendments to progression and clarification of language in particular for Digital Technologies
- the broad descriptions of the relationship of the general capabilities and cross-curriculum priorities to the Technologies curriculum.

Proposed areas to address in revisions to the Shape paper include:

- clarify the nomenclature for subjects, strands and sub-strands
- strengthen references to agriculture as food and fibre production
- strengthen references to food, nutrition and health
- strengthen statements about ICT capability and the difference between the capability and the curriculum
- clarify technologies contexts
- clarify the electives offered by states and territories
- improve clarity and coherence of the paper by improving navigation, reducing repetition and providing further explanation of terminology.

A greater number of individual responses were recorded for the online survey in comparison to organisation responses. State and territory education authorities and professional teacher associations were the largest contributors of written responses sent directly to ACARA.

While the structure of the learning area received the greatest proportion of negative feedback compared to other sections of the draft *Shape of the Australian Curriculum: Technologies* paper, as a whole, the paper was well received by Technologies stakeholders and their feedback was mostly constructive and detailed.

The analysis of consultation data will inform the final *Shape of the Australian Curriculum: Technologies*.

The ACARA Board acknowledges with appreciation the contributions of all respondents to the consultation.

Appendix 1

Online survey questions

Questions 1 - 7 were demographic questions. From question 8 onwards the respondents could choose from 'Strongly agree', 'Agree', 'Disagree' or 'Strongly disagree'. They could also include a comment in response to each question.

Background information

1. Are you responding as an individual or organisation?
    a. Individual
    b. Organisation

Individual feedback

2. In which state or territory are you primarily based? (Check as appropriate.)
    a. Australian Capital Territory
    b. New South Wales
    c. Northern Territory
    d. Queensland
    e. South Australia
    f. Tasmania
    g. Victoria
    h. Western Australia
    i. International

3. On which technologies context are your responses based? (Select one or more.)

    a. Agriculture/primary industries
    b. Constructed environments
    c. Design and technologies
    d. Digital technologies
    e. Engineering
    f. Food technologies
    g. Graphic technologies
    h. Industrial technologies
    i. ALL
    j. Other (please specify _____

Individual feedback

4. Which category of respondent best describes your perspective?
    a. Primary teacher (generalist)
    b. Primary teacher (technologies specialist)
    c. Secondary teacher (generalist)
    d. Secondary teacher (technologies specialist)
    e. School leader
    f. Academic
    g. Industry or business member
    h. Parent

i. Student
j. Other (please specify) _____

Group feedback

5. If you are providing a group or institutional response (e.g. school, professional association, university faculty, education authority), which category of respondent best describes your perspective?

    a. School
    b. Professional association
    c. University faculty
    d. Education authority
    e. Industry
    f. Other (please specify) _____

6. What is the name of your group/institution? _____

7. How many people have contributed to this response? _____

Background

8. The *Background* for the Australian Curriculum: Technologies makes clear what the learning area includes.

Key considerations

9. A structure based on Design and Technologies and Digital Technologies as two strands in Foundation to Year 8 followed by two distinct subjects in Years 9 to 10 is appropriate for the development of the Technologies curriculum.

Introduction

10. The *Introduction* for the *Australian Curriculum: Technologies* makes clear the important contribution of the Technologies curriculum for all young Australians.

11. The section, *The contribution of technologies education to students' lives,* appropriately captures the main contributions to students' education.

12. The section, *Technologies education for diverse learners,* appropriately shows how the Technologies curriculum will address student diversity.

Nature of the Technologies learning area

13. The section, *Nature of the Technologies learning area,* appropriately reflects the features and key concepts of Technologies education.

Aims

14. The Aims make clear the intended learning for students in the Australian Curriculum: Technologies.

Structure

Overarching idea

15. The overarching idea of ‘Engaging in creating preferred futures’ for both Design and Technologies and Digital Technologies is appropriate for a 21st century Technologies curriculum.

Questions 16 to 25 focus on the strand and sub-strand structure proposed for each of Design and Technologies and Digital Technologies. If you disagree with a statement, please indicate in your comments an alternative structure you would support.

Foundation to Year 8

Strands

16. From Foundation to Year 8 the two strands: Design and Technologies and Digital Technologies provide an appropriate structure for writing the Technologies curriculum.

Sub-strands: Design and Technologies

17. From Foundation to Year 8 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies.

18. From Foundation to Year 8 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Design and Technologies.

Sub-strands: Digital Technologies

19. From Foundation to Year 8 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies.

20. From Foundation to Year 8 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Digital Technologies.

Years 9 to 12

Subjects

From Year 9 to Year 12 Design and Technologies and Digital Technologies will be developed as separate subjects that students may choose to study, noting that students may also choose to study Technologies subjects offered by states and territories that complement and do not duplicate the Australian Curriculum.

21. From Year 9 to Year 12 the two subjects: Design and Technologies and Digital Technologies provide an appropriate structure for writing the Technologies curriculum.

Sub-strands: Design and Technologies

22. From Year 9 to Year 12 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Design and Technologies.

23. From Year 9 to Year 12 the two sub-strands for Design and Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Design and Technologies.

Sub-strands: Digital Technologies

24. From Year 9 to Year 12 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a coherent structure for describing the important elements of learning in Digital Technologies.

25. From Year 9 to Year 12 the two sub-strands for Digital Technologies: Knowledge and understanding; Processes and production, provide a useful structure for developing teaching and learning programs for Digital Technologies.

Organisation of the technologies curriculum

26. The organisation of the Technologies curriculum in bands is appropriate.

Scope and sequence

The Technologies curriculum across the years of schooling

27. The description and sequence of Technologies curriculum across the years of schooling is appropriate.

Design and Technologies across the years of schooling

28. The description and sequence of Design and Technologies learning in the Foundation to Year 2 band is appropriate.

29. The description and sequence of Design and Technologies learning in the Years 3 to 4 band is appropriate.

30. The description and sequence of Design and Technologies learning in the Years 5 to 6 band is appropriate.

31. The description and sequence of Design and Technologies learning in the Years 7 to 8 band is appropriate.

32. The description and sequence of Design and Technologies learning in the Years 9 to 10 band is appropriate.

33. The description and sequence of Design and Technologies learning in the senior secondary (Years 11 to 12) band is appropriate.

34. The progression from one band to another in the Design and Technologies scope and sequence is logical.

Digital Technologies across the years of schooling

35. The description and sequence of Digital Technologies learning in the Foundation to Year 2 band is appropriate.

36. The description and sequence of Digital Technologies learning in the Years 3 to 4 band is appropriate.

37. The description and sequence of Digital Technologies learning in the Years 5 to 6 band is appropriate.

38. The description and sequence of Digital Technologies learning in the Years 7 to 8 band is appropriate.

39. The description and sequence of Digital Technologies learning in the Years 9 to 10 band is appropriate.

40. The description and sequence of Digital Technologies learning in the senior secondary (Years 11 to 12) band is appropriate.

41. The progression from one band to another in the Digital Technologies scope and sequence is logical.

General capabilities

42. The broad description of the Literacy general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

43. The broad description of the Numeracy general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

44. The broad description of the ICT general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

45. The difference between the ICT general capability and the Digital Technologies curriculum is clear.

46. The broad description of the Critical and creative thinking general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

47. The broad description of the Personal and social general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

48. The broad description of the Ethical behaviour general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

49. The broad description of the Intercultural understanding general capability in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

Cross-curriculum priorities

50. The broad description of the cross-curriculum priority, Aboriginal and Torres Strait Islander histories and cultures, in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

51. The broad description of the cross-curriculum priority, Asia and Australia's engagement with Asia, in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

52. The broad description of the cross-curriculum priority, Sustainability, in relation to Technologies provides appropriate direction to inform the development of the detailed curriculum.

Key terms

53. The Key terms are described clearly.

54. The descriptions are appropriate for the learning area.

General comment

55. The overall directions proposed in the Draft *Shape of the Australian Curriculum: Technologies* paper are appropriate.

Appendix 2

The providers of submissions are listed below. Names of individual and international submissions are not listed in line with privacy laws.

State and territory education authorities

Northern Territory Department of Education and Training (NTDET)

Queensland Studies Authority, Education Queensland, Queensland Catholic Education Commission and Independent Schools Queensland (joint submission) (QLD)

South Australian Department of Education and Child Development (SADECD)

The Department of Education Western Australia (WA DET), Catholic Education Office of Western Australia (CEOWA), Association of Independent Schools of Western Australia (AISWA) and the School Curriculum and Standards Authority (joint submission) (WA)

Victorian Curriculum and Assessment Authority, Department of Education and Early Childhood, Catholic Education Commission of Victoria, Independent Schools Victoria (joint submission) (VIC)

Notes:

- Department of Education and Training, Tasmania (DET TAS) submitted a response via the online survey
- The NSW final joint submission from the Office of the Board of Studies NSW was not received at the time of collating this report (an outline of the Office's early findings was provided on 28 June 2012); the ACT Department of Education and Training (ACT DET) response was provided verbally.

Professional teacher associations

Australian Council for Computers in Education (ACCE)

Australian Primary Principals Association (APPA)

Design and Technology Teachers Association of Australia (DATTA)

Information and Communication Technology Education Victoria (ICTEV)

Information and Communication Technology Educators NSW (ICTENSW)

Home Economics Institute of Australia (HEIA)

Technology in Primary Schools (TiPS)

National Association of Agriculture Educators (NAAE)

Industry stakeholders

Australian Computer Society (ACS)

Australian Institute of Architects (AIA)

Dietitians Association of Australia (DAA)

Information Technology Industry Innovation Council (ITIIC)

NSW Farmers Association (NFA)

Primary Industries Education Foundation (PIEF)

Queensland ICT Leaders Group (QICTLG)

South Australian Network of Nutrition and health professionals (SANN)

Education stakeholders

Asia Education Foundation (AEF)

Association of Independent Schools WA (AISWA) (also contributed to WA submission)

Independent Schools Queensland (ISQ) (also contributed to QLD submission)

Lutheran Education Queensland

Queensland Catholic Education Commission (QCEC) (also contributed to QLD submission)

Media Access Australia (MAA)

National Youth Forum (NYF)

Organisations

Australian Securities and Investment Commission (ASIC)

South Australian Health (SA Health)

Defence Signals Directorate (DSD)

Schools

Kingston High School, Tasmania

Wingham High School, NSW

Universities

Australian Council of Deans of ICT (ACDICT)

School of Information Technology, Bond University

Individuals

7 responses