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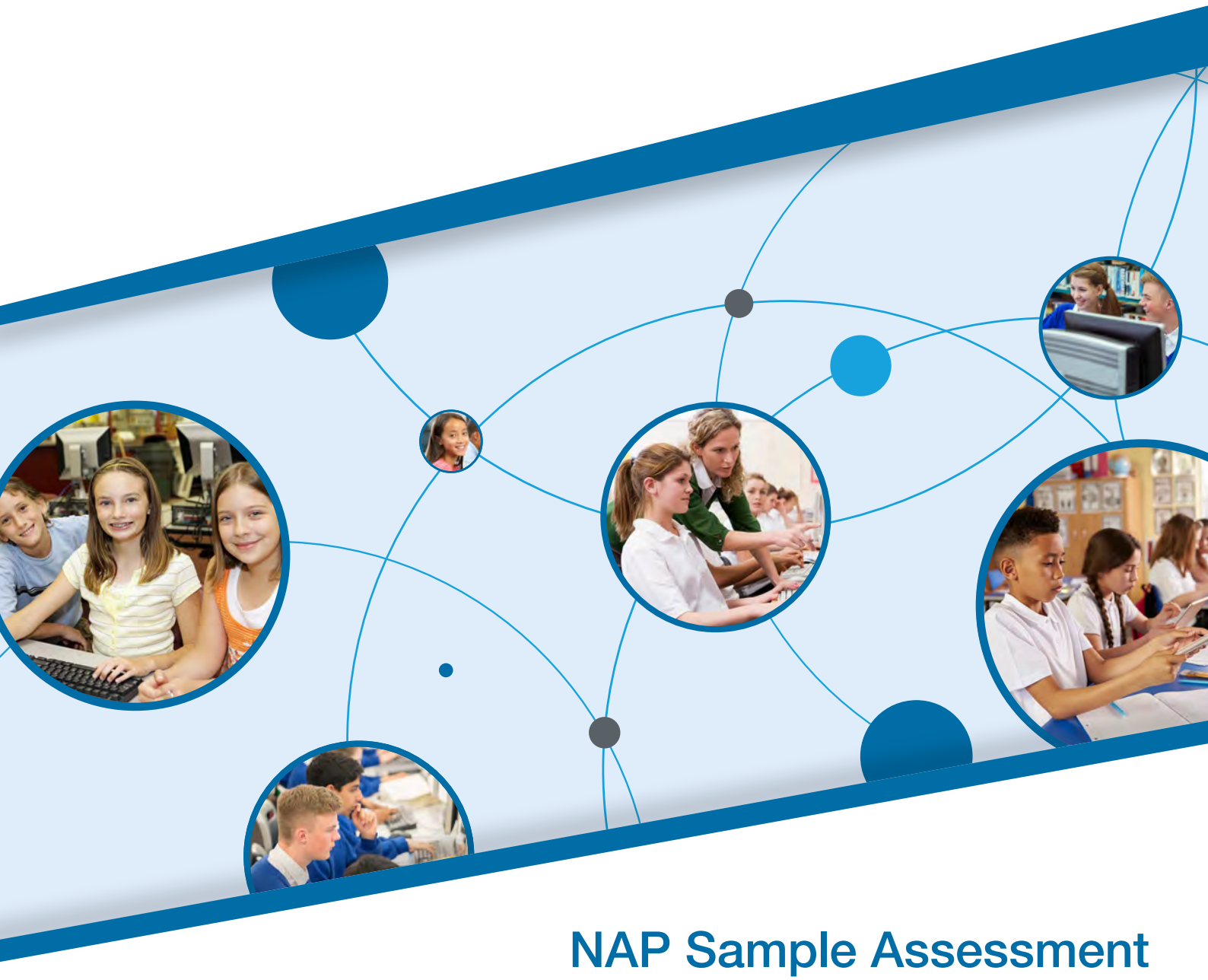

NAP Sample Assessment ICT Literacy

Years 6 and 10

November 2018

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Australian CURRICULUM
NAP NATIONAL ASSESSMENT PROGRAM
My School®

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Foreword

Equipping our young Australians with essential information and communication technology (ICT) knowledge, understanding and skills is considered crucial in this digital age. Under the auspices of the Education Council, ACARA collects ICT literacy student performance data from a representative sample of schools across Australia every three years.

This report presents the findings for Year 6 and Year 10 student achievement in ICT literacy together with survey findings related to students' use of digital devices in and outside of school, and their attitudes towards using ICT.

The NAP–ICT Literacy assessment framework underpinning the design of the test, includes opportunities for students to demonstrate their ICT literacy abilities across a range of integrated 'real-world' tasks including accessing and managing information, sharing knowledge, creating information products and using ICT responsibly by considering social, legal and ethical questions.

This is the fifth cycle of NAP–ICT Literacy and the findings in this report suggest that there is an opportunity in Australia for student ICT literacy to improve, despite the survey showing high frequencies of device usage, positive attitudes towards technology and the continued prolific and pervasive use of entertainment and communication applications.

The findings in this report should also be used by national and jurisdictional policy makers and educational practitioners alike to ensure that the gender and geolocation performance disparities are addressed together with a continued and concerted focus on improving ICT learning opportunities for Aboriginal and Torres Strait Islander students.

Also provided in this report are many insightful suggestions and recommendations relating to how the Australian Curriculum: ICT Capability (which is addressed across all learning areas and explicitly in the Australian Curriculum: Digital Technologies) can provide opportunities for students to develop important knowledge, skills and ways of operating in the world that are beneficial to young people now and into their future. The Australian Curriculum: ICT Capability and the Australian Curriculum: Digital Technologies provide a systematic and sequential approach for teachers to develop their students' ICT literacy. As teachers build their pedagogical content knowledge, there is potential for this new confidence in skills and knowledge to support improvements in NAP-ICT Literacy assessments.

With the introduction of the Digital Technologies curriculum in all states and territories from 2019 there is now scope to review the existing framework to encompass not only ICT skills but also some of the new and exciting key ideas from the Technologies curriculum in readiness for the 2020 assessment cycle.

ACARA acknowledges and thanks the many senior ICT educators, representing all jurisdictions and sectors, who have contributed to the development of this assessment.

ACARA also acknowledges the combined expertise of the Australian Council for Educational Research and ACARA's NAP-ICTL technology partner, SoNET Systems, and of course the many principals, teachers and students at government, Catholic and independent schools involved in the trial and the main assessment in 2017.

I commend this report to teachers, policy makers and the educational community at large. As a nation, it is clear that we must continue to focus our energies on ensuring that all students across Australia are provided with the essential 21st century thinking and digital skills to support successful learning and active participation in society. Achieving this goal is our collective responsibility.

Ms Belinda Robinson FAICD
Chair
Australian Curriculum, Assessment and Reporting Authority Board

List of acronyms

AC	Australian Curriculum
ACARA	Australian Curriculum, Assessment and Reporting Authority
ICT	Information and communication technologies
IRT	Item Response Theory
KPM	Key performance measures
LBOTE	Language background other than English
MCEETYA	Ministerial Council on Education, Employment, Training and Youth Affairs
NAP	National Assessment Program
NAPLAN	National Assessment Program – Literacy and Numeracy
NAP–ICT	National Assessment Program – Information & Communication Technologies Literacy
TRT	Technical readiness test

Some terms used in this report

Term	Definition
AC: ICT Capability	The Australian Curriculum: ICT Capability was released in 2012. The AC: ICT Capability conceptualises ICT as a cross-disciplinary capability that comprises a broad set of interrelated organising elements that describe: how to use ICT effectively and appropriately to access, create and communicate information and ideas, solve problems and work collaboratively in all learning areas at school and in their lives beyond school. ICT capability involves students learning to make the most of the digital technologies available to them, adapting to new ways of doing things as technologies evolve and limiting the risks to themselves and others in a digital environment (ACARA, 2012).
AC: Digital Technologies	The Australian Curriculum: Digital Technologies was released in 2015. In Digital Technologies students use computational thinking and information systems to define, design and implement digital solutions. The AC: Digital Technologies empowers students to shape change by influencing how contemporary and emerging information systems and practices are applied to meet current and future needs. A deep knowledge and understanding of information systems enables students to be creative and discerning decision-makers when they select, use and manage data, information, processes and digital systems to meet needs and shape preferred futures (ACARA, 2015).
Achievement level	In 2005 six achievement levels were established at equally–spaced intervals across the NAP–ICT Literacy scale. Each achievement level spans 120 scale points. Each level description provides a synthesised overview of the knowledge skills and understandings that a student working within the level is able to demonstrate.

Confidence interval	An estimate derived from a sample is subject to uncertainty because the sample may not reflect the population precisely. The extent to which this variation exists is expressed as the confidence interval. The 95 per cent confidence interval is the range within which the estimate of the statistic based on repeated sampling would be expected to fall for 95 of 100 samples that might have been drawn.
Exempt	Students with a language background other than English, who arrived from overseas less than a year before the tests, and students with significant intellectual disabilities or functional disabilities may be exempted from testing.
Functional disability	The student has a moderate to severe permanent physical disability such that he or she could not perform in the assessment situation.
Geolocation	The MCEECDYA Schools Geographic Location Classification System is based on the locality of individual schools and is used to disaggregate data according to Metropolitan, Provincial and Remote.
ICT Literacy	The ability of individuals to use ICT appropriately to access, manage and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society.
Indigenous status	A student is considered to be 'Indigenous' if he or she identifies as being of Aboriginal and/or Torres Strait Islander origin. The term 'origin' is considered to relate to people's Australian Aboriginal or Torres Strait Islander descent and for some, but not all, their cultural identity.
Intellectual disability	The student has a mental or emotional disability and cognitive delay such that he or she could not perform in the assessment situation.
Language background other than English (LBOTE)	A student is classified as LBOTE if the student or parents/guardians mainly speak a language other than English at home.
Limited assessment language proficiency	The student is unable to read or speak the language of the assessment and would be unable to overcome the language barrier in the assessment situation. Typically, a student who has received less than one year of instruction in the language of the assessment would be excluded.
NAP–ICTL Assessment Framework	This assessment framework includes information on how the content assessed in NAP–ICT Literacy relates to the Australian Curriculum: ICT Capability and Australian Curriculum: Digital Technologies.
NAP–ICT Literacy scale	The NAP–ICT Literacy scale is a continuous scale that provides a measure of student achievement in ICT Literacy.
Parental education	Parental education represents the highest level of parental school or non–school education that a parent/guardian has completed. This includes the highest level of primary or secondary school completed or the highest post–school qualification attained.
Parental occupation	Parental occupation represents the occupation group that includes the main work undertaken by the parent/guardian. If a parent/guardian has more than one job, the occupation group that reflects their main job is reported.

Participation rates	Participation rates are the percentages of sampled students that participated in the assessment. Participation rates are calculated as the number of assessed students from whom data were recorded as a percentage of the total number of sampled students in the year level.
Percentages	The percentages of students represented in the tables have been rounded and may not always add up to 100.
Proficient standard	Proficient standards represent a 'challenging but reasonable' expectation of student achievement at a year level. Proficient standards provide reference points of reasonable expectation of student achievement at that year level in the area. The proficient standards in ICT Literacy (one for Year 6 and one for Year 10) were established as a result of consultations with ICT experts and representatives from jurisdictions and sectors as part of NAP–ICT Literacy – 2005.
Sample	A sample is a subset of a population selected so that reliable and unbiased estimates of statistics for the full population can be inferred.
Significant difference	A statistically significant difference refers to the likelihood of a difference being a true reflection of the measured outcomes rather than the result of chance.
Standard deviation	The standard deviation is a measure of variability or dispersion in student scores from the mean (or average).
Trend module	A test module used in at least one of the previous NAP–ICT assessment cycles.
Withdrawn	Students may be withdrawn from the testing program by their parent/carer. Withdrawals are intended to address issues such as religious beliefs and philosophical objections to testing.

Executive summary

Introduction

This report documents the findings of the fifth triennial National Assessment Program – ICT Literacy (NAP–ICT Literacy) assessment cycle.

The NAP–ICT Literacy assessment provides a basis on which national key performance measures (KPMs) can be reported and a mechanism for monitoring progress towards the Melbourne Declaration on Educational Goals for Young Australians (Melbourne Declaration).

Editions of this report for the four previous cycles are available on the ACARA NAP website.

Overview of the report

Information relating to the historical context of the National Assessment Program and the connections to the Australian Curriculum is provided in chapter 1.

Context

The Melbourne Declaration, adopted by state, territory and Commonwealth ministers of education in 2008, sets out educational goals for young Australians.

Goal 2 in the Melbourne Declaration states, among other things, that all young Australians 'become successful learners, confident and creative individuals, and active and informed citizens'.

The declaration goes on to elaborate that 'successful learners': have the essential skills in literacy and numeracy and are creative and productive users of technology, especially ICT, as a foundation for success in all learning areas.

What is assessed in NAP–ICT Literacy

According to the NAP–ICT Literacy Assessment Framework, ICT literacy is demonstrated through the application of six integrated processes:

i. accessing information (identifying the information needed and knowing how to find and retrieve information)
ii. managing information (organising and storing information for retrieval and re-use)
iii. evaluating (reflecting on the processes used to design and construct ICT solutions and making judgements regarding the integrity, relevance and usefulness of information)
iv. developing new understandings (creating information and knowledge by synthesising, adapting, applying, designing, inventing or authoring)
v. communicating (exchanging information by sharing knowledge and creating information products to suit the audience, the context and the medium)
vi. using ICT appropriately (making critical, reflective and strategic ICT decisions and using ICT responsibly by considering social, legal and ethical issues).

The NAP–ICT Literacy assessment instrument requires students to apply the ICT literacy processes within real-world contexts.

NAP–ICT Literacy and the Australian Curriculum

In 2012, ministers endorsed the Australian Curriculum: ICT Capability and in 2015, ministers endorsed the Australian Curriculum: Digital Technologies.

As part of the work on NAP–ICT Literacy 2017, the NAP–ICT Literacy Assessment Framework was revised to describe and represent its relationship to the Australian Curriculum: ICT Capability and the Australian Curriculum: Digital Technologies.

The Australian Curriculum: ICT Capability is highly congruent with the content of the NAP–ICT Literacy 2017 Assessment Framework. The two share common conceptualisations of the purpose of ICT literacy and describe very similar and largely overlapping processes. The Australian Curriculum: Digital Technologies shares a common core with what is assessed in NAP–ICT Literacy, through the application of digital solutions to real-world problems.

Further information about the relationship between NAP–ICT Literacy and the Australian Curriculum is provided in chapters 1 and 7.

Assessment administration

The assessment instrument was administered online to representative, random samples of students in Year 6 and Year 10 in October and November 2017. Data were provided by 5,439 Year 6 students in 327 schools and 4,885 Year 10 students in 313 schools.

Detailed descriptions of the methods used to develop and administer the assessment are provided in chapter 2.

Assessment instrument

The assessment instrument consisted of seven discrete test modules delivered online, each of which could be completed in a maximum of 20 minutes (controlled by the testing software). Each module followed a linear narrative sequence designed to reflect typical 'real-world' use of ICT. The modules included a range of school-based and out-of-school-based themes.

Following the test, all students completed a survey designed to measure their access to and use of digital devices in and outside of school, as well as their attitudes towards using digital devices.

NAP–ICT Literacy scale

The scale comprises six achievement levels that are used to describe the achievement of students both at Year 6 and Year 10. The scale was set in 2005, with a mean score of 400 and standard deviation of 100 scale points for the national Year 6 sample. NAP–ICT Literacy scale scores from all four assessment cycles are reported on this same metric.

Two proficient standards – one for Year 6 and one for Year 10 – were established in 2005 on the NAP–ICT Literacy scale. Each standard is a point on the scale that represents a 'challenging but reasonable' expectation of student achievement at that year level.

The proficient standard for Year 6 is the boundary between levels 2 and 3 on the NAP–ICT Literacy scale. The proficient standard for Year 10 is the boundary between levels 3 and 4 on the scale. The proportion of students attaining at or above each proficient standard is the key performance measure for ICT literacy at each year level.

Chapter 3 discusses the NAP–ICT Literacy scale and its properties. It outlines the six achievement levels that are used to describe the achievement of students. Student achievement for Year 6 and for Year 10 is reported at the national level and by the following population sub-group categories: gender, Indigenous status, language spoken at home, country of birth, school geographic location, and parental occupation and education.

KPM: Performance against the Year 6 proficient standard

At the national level in 2017, 53 per cent of Year 6 students attained the proficient standard. This is significantly lower than the percentage achieved nationally in 2011, but not significantly different from the percentage achieved nationally in any other cycles of NAP–ICT Literacy (Table ES1).

There has been very little variation in the percentage of students attaining the proficient standard within each state and territory since 2005.

Table ES1 Percentages of Year 6 students attaining the proficient standard nationally and by state and territory since 2005

	2017		2014		2011		2008		2005	
NSW	51	(±4.2)	55	(±4.9)	▲ 66	(±4.1)	55	(±5.7)	51	(±6.6)
Vic.	62	(±4.5)	64	(±4.5)	64	(±3.8)	66	(±6.5)	58	(±6.3)
Qld	47	(±5.8)	48	(±5.8)	55	(±4.8)	48	(±5.3)	38	(±5.3)
WA	54	(±4.5)	52	(±4.8)	59	(±5.5)	51	(±4.1)	▼ 40	(±5.4)
SA	53	(±6.5)	59	(±4.3)	62	(±4.9)	▲ 64	(±5.3)	52	(±5.0)
Tas.	49	(±5.9)	46	(±5.4)	51	(±5.5)	52	(±7.0)	49	(±9.0)
ACT	65	(±8.4)	58	(±10.6)	74	(±8.3)	75	(±6.6)	58	(±12.5)
NT	35	(±11.5)	43	(±6.3)	42	(±9.2)	42	(±10.6)	36	(±10.0)
Aust.	53	(±2.4)	55	(±2.5)	▲ 62	(±2.0)	57	(±2.8)	49	(±3.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Year 6 average score performance

At the national level in 2017, the average scale score of students in Year 6 was 410 score points. This was significantly lower than in 2011, but not significantly different from the average in any other cycles (Table ES2).

Table ES2 ICT literacy average scale scores nationally and by state and territory for Year 6 since 2005

	2017		2014		2011		2008		2005	
NSW	404	(±11.9)	412	(±12.0)	▲ 445	(±12.5)	413	(±14.5)	405	(±12.9)
Vic.	432	(±9.4)	437	(±9.6)	448	(±9.3)	447	(±15.1)	424	(±13.7)
Qld	399	(±12.4)	393	(±13.7)	415	(±14.0)	392	(±11.8)	▼ 370	(±12.3)
WA	406	(±10.3)	404	(±13.2)	424	(±13.5)	403	(±11.5)	▼ 379	(±10.8)
SA	405	(±14.9)	421	(±10.3)	▲ 436	(±10.3)	▲ 439	(±12.5)	412	(±11.4)
Tas.	390	(±12.9)	385	(±15.1)	405	(±12.4)	408	(±16.4)	404	(±19.4)
ACT	437	(±17.3)	429	(±26.0)	466	(±22.8)	▲ 472	(±13.9)	428	(±22.1)
NT	335	(±43.5)	361	(±20.5)	367	(±37.5)	364	(±49.8)	346	(±53.7)
Aust.	410	(±5.4)	413	(±5.7)	▲ 435	(±5.7)	419	(±6.9)	400	(±6.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

KPM: Performance against the Year 10 proficient standard

At the national level in 2017, 54 per cent of Year 10 students attained the proficient standard. This is significantly lower than the percentages achieved nationally in 2008 and 2011, but not significantly different from the percentage achieved nationally in NAP–ICT Literacy in 2005 or 2014 (Table ES3).

Table ES3 Percentages of Year 10 students attaining the proficient standard nationally and by state and territory since 2005

	2017		2014		2011		2008		2005	
NSW	57	(±6.8)	50	(±5.5)	66	(±5.3)	67	(±5.4)	61	(±7.6)
Vic.	55	(±5.0)	55	(±5.9)	▲ 68	(±4.9)	▲ 70	(±6.7)	▲ 67	(±4.8)
Qld	47	(±6.6)	47	(±5.6)	▲ 63	(±4.3)	▲ 62	(±6.2)	60	(±7.4)
WA	62	(±4.0)	57	(±5.8)	61	(±4.0)	65	(±5.9)	56	(±6.1)
SA	56	(±4.6)	57	(±5.9)	63	(±5.6)	▲ 65	(±4.9)	61	(±5.4)
Tas.	39	(±5.6)	▲ 51	(±5.8)	▲ 54	(±7.1)	▲ 58	(±7.4)	▲ 56	(±6.4)
ACT	54	(±8.4)	60	(±9.1)	▲ 72	(±7.0)	▲ 77	(±6.1)	66	(±11.4)
NT	27	(±8.4)	▲ 43	(±9.1)	▲ 48	(±8.8)	▲ 46	(±13.4)	▲ 56	(±13.2)
Aust.	54	(±3.0)	52	(±2.5)	▲ 65	(±2.3)	▲ 66	(±3.0)	61	(±3.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Year 10 average score performance

At the national level in 2017, the average scale score of students in Year 10 was 523 score points. This was significantly lower than in 2011, 2008 and 2005 but not significantly different from the average reported in 2014 (Table ES4).

Table ES4 ICT literacy average scale scores nationally and by state and territory for Year 10 since 2005

	2017		2014		2011		2008		2005	
NSW	531	(±16.4)	512	(±13.7)	▲ 565	(±12.8)	▲ 564	(±13.7)	551	(±13.1)
Vic.	530	(±10.6)	532	(±14.3)	▲ 568	(±12.5)	▲ 569	(±18.1)	▲ 565	(±9.8)
Qld	505	(±13.1)	504	(±16.8)	▲ 553	(±9.5)	▲ 549	(±14.0)	▲ 547	(±11.6)
WA	539	(±10.4)	539	(±11.8)	548	(±10.8)	559	(±12.1)	535	(±11.8)
SA	524	(±11.0)	532	(±15.8)	▲ 552	(±14.8)	▲ 560	(±11.5)	547	(±11.0)
Tas.	480	(±13.0)	▲ 514	(±15.6)	▲ 534	(±15.5)	▲ 539	(±16.3)	▲ 538	(±11.8)
ACT	530	(±21.2)	536	(±26.2)	▲ 582	(±16.1)	▲ 598	(±14.5)	▲ 572	(±17.8)
NT	447	(±30.3)	▲ 501	(±19.9)	490	(±49.5)	466	(±71.5)	▲ 515	(±28.2)
Aust.	523	(±6.6)	520	(±6.7)	▲ 559	(±5.7)	▲ 560	(±7.1)	▲ 551	(±5.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Performance by background characteristics

Differences in ICT literacy achievement between male and female students

Fifty-six per cent of female Year 6 students reached the proficient standard, compared to 51 per cent of male Year 6 students. For Year 10 students, the percentages were 58 and 51, respectively.

Nationally at Year 6, female students outperformed male students by 14 score points on the NAP–ICT Literacy scale in 2017 and this difference was statistically significant. In Year 10, the gender difference in favour of female students was 19 score points at the national level and this difference was also statistically significant.

Differences in ICT literacy achievement by Indigenous status

At both year levels, there were large statistically significant differences between the achievement of non-Indigenous and Indigenous students.

Nationally in 2017, 24 per cent of Indigenous Year 6 students reached the proficient standard, compared to 55 per cent of non-Indigenous Year 6 students. For Year 10 students, the percentages were again 24 and 55, respectively.

The Year 6 mean scores of Indigenous and non-Indigenous students were 311 and 415 score points, respectively. At Year 10, the mean scores were 428 and 526 score points, respectively. These differences are significant and large.

Differences in ICT literacy achievement by language background

Year 6 students who speak a language other than English at home outperformed students who speak English at home (a significant difference of 13 score points). The difference was not significant for Year 10 students.

Differences in ICT literacy achievement by country of birth

No significant difference between Year 6 students born in Australia and those born overseas was found. However, Year 10 students born in Australia significantly outperformed those born overseas by 21 score points.

Differences in ICT literacy achievement by geographic location

School geographic location was classified as metropolitan, regional and remote, as specified by the Australian Statistical Geography Standard Remoteness Structure. At both Year 6 and Year 10, students from metropolitan schools had the highest scale scores, and those from remote schools had the lowest scale scores. These differences were significant.

Differences in ICT literacy achievement by parental occupation

At both year levels, students with parents who were senior managers or professionals had significantly higher NAP–ICT Literacy scale scores than students with parents who were classified as unskilled labourers, office, sales or service staff. The differences between the average scores of students in these two groups were 78 and 65 score points for Year 6 and Year 10 respectively.

Differences in ICT literacy achievement by parental education

Students who had a parent with a bachelor degree or above achieved, on average, more than 100 scale score points (almost one achievement level) higher than students whose parent completed Year 10 or Year 9 as their highest level of education.

Results of the student survey

Chapters 4, 5 and 6 provide the results of the student survey. Following are key findings from each chapter.

Chapter 4

- The majority of students (64 per cent of Year 6 students and 79 per cent of Year 10 students) reported having at least five years' experience using digital devices.
- Higher levels of digital device experience were associated with higher levels of ICT literacy, particularly in Year 10.
- Digital device self-efficacy was higher in Year 10 than Year 6, and higher for males than females.
- Higher levels of self-efficacy were associated with higher levels of ICT literacy for female and male students.
- Students' ratings of the importance of using digital devices were higher in Year 10 than in Year 6, and higher for males than females.
- Higher ratings of the importance of using digital devices were associated with higher levels of ICT literacy, particularly for Year 10 students, and particularly for male students.

Chapter 5

- The most frequently reported activity on the study utility index by both Year 6 and Year 10 students was searching the internet for information for study or schoolwork. This was true regardless of location (that is, both at school and outside of school).
- Outside of school, male students were significantly more likely to report using entertainment applications than female students. The difference was more marked at Year 10 but was still observable among Year 6 students.
- For both Year 6 and Year 10, students with lower ICT literacy achievement were more likely to report frequent use of entertainment applications when at school. This was particularly true for students in Year 6 and for male students in both year levels.
- Lower achieving Year 6 students reported slightly more frequent use of communication applications than did higher achieving students. This was true for both female and male Year 6 students.
- Both Year 6 and Year 10 students reported undertaking technological activities far less frequently than activities relating to study, entertainment and communication. Between 60 and 90 per cent of students rarely engaged in technological tasks at school or outside of school.
- For Year 6 students, there was a small, negative association between ICT literacy achievement and frequency of use of digital devices to complete technological tasks.

Chapter 6

- Of the ICT-related tools for school-related purposes, students at both year levels were most likely to use word-processing software, presentation software and computer-based information resources. These types of software were more frequently used by Year 10 students than Year 6 students.
- More frequent use of productivity applications (such as word processing and spreadsheet applications) was positively associated with achievement, whereas more frequent use of specialist applications (such as concept mapping or simulations and modelling applications) was negatively associated with achievement.
- Students reported that they were more likely than not to have learnt at school about how to look for different types of digital information on a topic, how to decide where to look for information about an unfamiliar topic, and the need to provide references to content from webpages.
- The most common activities using digital devices in class, across year levels, were teachers presenting information to the class, students presenting to the class and students working on short assignments.
- Frequency of use of digital devices in general classroom activities was positively associated with achievement, but frequency of use of digital devices in classroom activities requiring specialist software applications was negatively associated with achievement.
- In general, students reported receiving relatively little instruction in digital technologies–related tasks in comparison with issues relating to ICT literacy. This will likely change given that 2017 was the first year of implementation of the Australian Curriculum: Digital Technologies for a number of states and territories.

Chapter 7 includes reflections on what the findings of NAP–ICT Literacy suggest for teachers and teaching in the context of the Australian Curriculum.

The Australian Curriculum: Digital Technologies and the Australian Curriculum: ICT Capability provide opportunities for teachers to engage students in the skills, knowledge and understanding that underpin NAP–ICT Literacy.

The advent of the Australian Curriculum: ICT Capability, and more recently the Australian Curriculum: Digital Technologies, provide educators with curriculum resources that previously were unavailable. NAP–ICT Literacy 2017 provided evidence of the potential value of targeted ICT literacy–related classroom activities to the development of ICT literacy in students. Chapter 7 of this report highlights some of the ways that explicit teaching of ICT literacy–related outcomes can lead to positive learning outcomes in students.

1

Introduction

The National Assessment Program (NAP) commenced as an initiative of ministers of education in Australia to monitor outcomes of schooling specified in the 1999 Adelaide Declaration on National Goals for Schooling in the 21st Century (Adelaide Declaration).

NAP was established to measure student achievement and to report this against key performance measures (KPMs) in relation to the national goals, using nationally comparable data in each of literacy, numeracy, science, information and communication technologies (ICT), and civics and citizenship.

In 2008, the Adelaide Declaration was superseded by the Melbourne Declaration on the Educational Goals for Young Australians (Melbourne Declaration). The work of NAP has continued and was refined, as necessary, to monitor and report on the goals specified in the Melbourne Declaration.

As part of its preamble, the Melbourne Declaration asserts:

> Rapid and continuing advances in information and communication technologies (ICT) are changing the ways people share, use, develop and process information and technology. In this digital age, young people need to be highly skilled in the use of ICT. While schools already employ these technologies in learning, there is a need to increase their effectiveness significantly over the next decade.

Goal 2 of the Melbourne Declaration states, among other things, that all young Australians 'become successful learners, confident and creative individuals, and active and informed citizens'.

The declaration goes on to elaborate that 'successful learners':

> have the essential skills in literacy and numeracy and are creative and productive users of technology, especially ICT, as a foundation for success in all learning areas.

Under NAP, literacy and numeracy achievements are measured and reported via the National Assessment Program – Literacy and Numeracy (NAPLAN), and achievement in science, civics and citizenship, and ICT literacy are assessed under the NAP – sample assessment program. These assessments are developed and managed by the Australian Curriculum, Assessment and Reporting Authority (ACARA) under the auspices of the Education Council.

The first collection of data from students in the National Assessment Program – ICT Literacy (NAP–ICT Literacy) was in 2005; subsequent cycles of assessment have been conducted in 2008, 2011, 2014 and 2017. This report documents findings from NAP–ICT Literacy 2017 and includes comparisons, as appropriate, with findings from previous assessment cycles.

The NAP–ICT Literacy Assessment Framework

The development of NAP–ICT Literacy 2017 was based on the NAP–ICT Literacy Assessment Framework 2017.

The definition and conceptual structure of ICT literacy in the assessment framework are consistent with that used in the previous NAP–ICT Literacy assessments in 2014, 2011, 2008 and 2005. Under this structure, ICT literacy is described as consisting of a set of six processes that are demonstrated across the contexts described in three strands.

ICT literacy definition

The definition of ICT literacy used in NAP–ICT Literacy is:

> The ability of individuals to use ICT appropriately to access, manage and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society.
>
> (MCEETYA, 2005; ACARA, 2017)

ICT literacy strands

Student achievement in ICT literacy can only be demonstrated by taking into account the communicative context, purpose and consequences of the medium. These are described in the NAP–ICT Literacy Assessment Framework according to three strands: (a) Working with information, (b) Creating and sharing information and (c) Using ICT responsibly.

(a) *Working with information* includes identifying the information needed; formulating and executing a strategy to find information; making judgements about the integrity of the source and content of the information; and organising and storing information for retrieval and re-use.

(b) *Creating and sharing information* includes adapting and authoring information; analysing and making choices about the nature of the information product; reframing and expanding existing information to develop new understandings; and collaborating and communicating with others.

(c) *Using ICT responsibly* includes understanding the capacity of ICT to impact on individuals and society and the consequent responsibility to use and communicate information legally and ethically.

ICT literacy processes

According to the NAP–ICT Literacy Assessment Framework, ICT literacy is demonstrated through the application of six integrated processes:

i. accessing information (identifying the information needed and knowing how to find and retrieve information)
ii. managing information (organising and storing information for retrieval and re-use)
iii. evaluating (reflecting on the processes used to design and construct ICT solutions and making judgements regarding the integrity, relevance and usefulness of information)
iv. developing new understandings (creating information and knowledge by synthesising, adapting, applying, designing, inventing or authoring)
v. communicating (exchanging information by sharing knowledge and creating information products to suit the audience, the context and the medium)
vi. using ICT appropriately (making critical, reflective and strategic ICT decisions and using ICT responsibly by considering social, legal and ethical issues).

The NAP–ICT Literacy assessment instrument requires students to apply the ICT literacy processes within real-world contexts that represent the three strands in the assessment framework. The assessment instrument is described in chapter 2.

NAP–ICT Literacy and the Australian Curriculum

In 2012, the Australian Curriculum: ICT Capability (ACARA) was released. The Australian Curriculum: ICT Capability conceptualises ICT as a cross-disciplinary capability that comprises a broad set of interrelated organising elements that describe:

> how to use ICT effectively and appropriately to access, create and communicate information and ideas, solve problems and work collaboratively in all learning areas at school and in their lives beyond school.
>
> (ACARA, 2015)

The purpose of ICT use, as defined by the Australian Curriculum: ICT Capability is consistent with the definition established for use in NAP–ICT Literacy, and the organising elements are highly congruent with the processes defined in the NAP–ICT Literacy Assessment Framework.

In 2015, the Australian Curriculum: Digital Technologies was released (ACARA, 2015). While the structure and focus of the Australian Curriculum: Digital Technologies are different from those of the Australian Curriculum: ICT Capability and NAP–ICT Literacy (which is conceptualised as a learning area), the content of some of the strands are complementary and, in some areas, overlapping.

As part of the work on NAP–ICT Literacy 2017, the NAP–ICT Literacy Assessment Framework was revised to describe and represent its relationship to the Australian

Curriculum: ICT Capability and the Australian Curriculum: Digital Technologies. Content from the Australian Curriculum: Digital Technologies that was related to ICT, as conceptualised by NAP–ICT Literacy, was summarised and aligned with the processes from the NAP–ICT Literacy Assessment Framework.

Figure 1.1 shows the relationships between the organising elements of the Australian Curriculum: ICT Capability, the summarised Australian Curriculum: Digital Technologies, and the processes assessed in the NAP–ICT Literacy Assessment Framework.

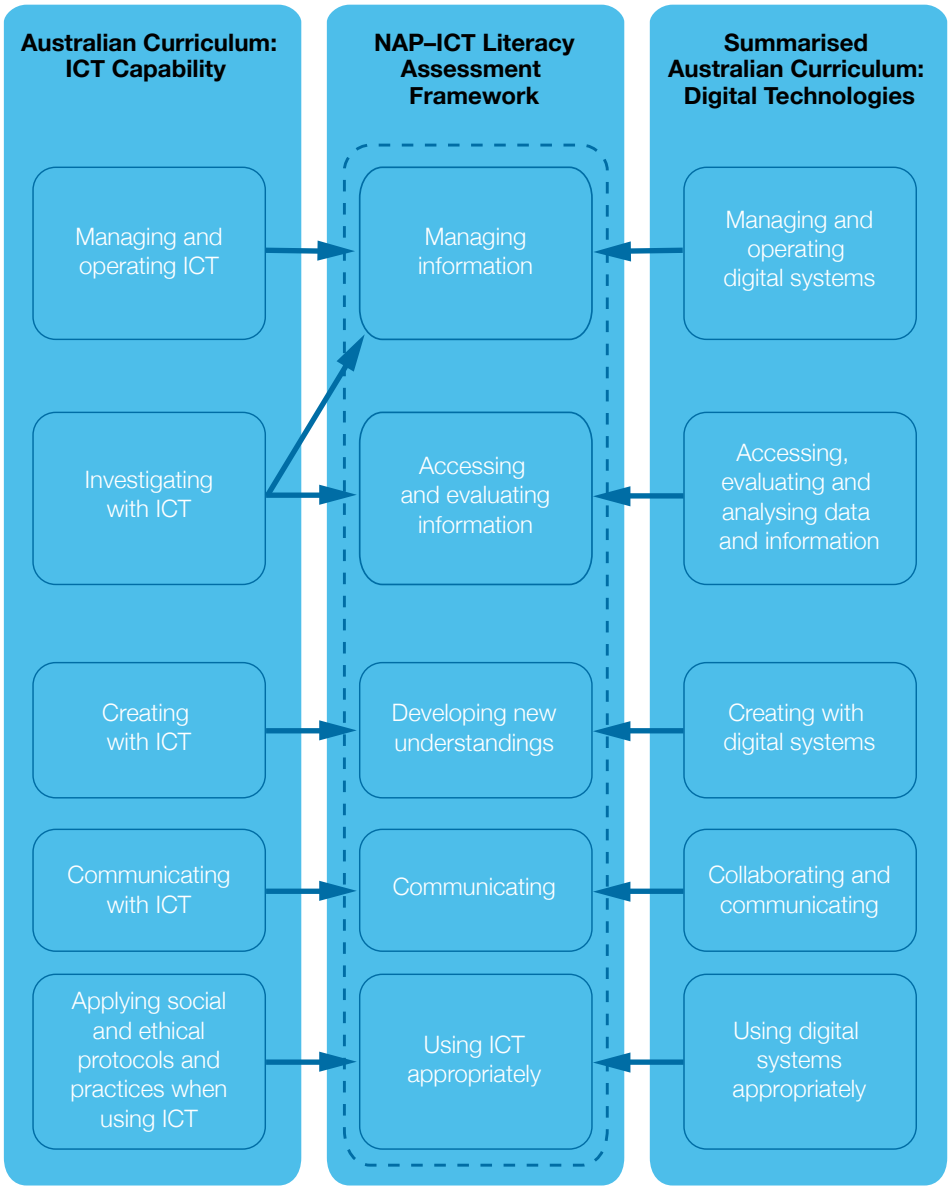

Figure 1.1 Mapping the NAP–ICT Literacy processes against the Australian Curriculum

In the mapping shown in Figure 1.1, the NAP–ICT Literacy processes of 'accessing information' and 'evaluating information' have been displayed together as a single

composite process. The dashed line surrounding the NAP–ICT Literacy processes is used to show that, while these processes are described separately, they are reported using a single score. Although Figure 1.1 shows how the broad content headings connect between the two, it is important to note that the processes for the Australian Curriculum: Digital Technologies shown in Figure 1.1 are summaries for the purpose of comparison. A full explanation of the method used to map the NAP–ICT Literacy Assessment Framework processes against the elements of the Australian Curriculum: ICT Capability and the summarised Australian Curriculum: Digital Technologies is available in the NAP–ICT Literacy Assessment Framework 2017.

In summary, the NAP–ICT Literacy 2017 Assessment Framework is highly congruent with the Australian Curriculum: ICT Capability. The two share common conceptualisations of the purpose of ICT literacy and describe very similar and largely overlapping processes. The Australian Curriculum: Digital Technologies shares a common core with what is assessed in NAP–ICT Literacy through the creation of digital solutions to real-world problems. However, the two have different conceptual emphases. While tasks relating to NAP–ICT Literacy and the Australian Curriculum: Digital Technologies can make use of similar contexts and software applications, the emphasis in NAP–ICT Literacy is on information processing in a digital environment, whereas the emphasis in the Australian Curriculum: Digital Technologies is on creating digital solutions to achieve outcomes. Further details of the Australian Curriculum: ICT Capability and the Australian Curriculum: Digital Technologies are presented in chapter 7.

Stages of development for NAP–ICT Literacy

The first stage of NAP–ICT Literacy 2017 was a review of the contexts in which ICT literacy could be demonstrated by young people. The outcomes of this review informed the selection and development of assessment contexts for inclusion in the 2017 assessment. This work was conducted in consultation with ACARA and the NAP–ICT Literacy Working Group.

The second stage consisted of the development of instruments and technologies for delivery. In NAP–ICT Literacy 2017, three new test modules were developed to complement four secure assessment modules that had been used in NAP–ICT Literacy 2014 and were to be used again in 2017. At the same time, the student survey was updated and revised in consultation with ACARA and the NAP–ICT Literacy Working Group.

The third stage involved the field trial of the instruments, which was conducted with 1,558 students in 44 schools from three states and territories in June 2017.

The fourth stage involved a revision of the instruments on the basis of the analyses of the field trial data. This activity involved an evaluation of the characteristics of each task to determine whether it should be deleted from the scaling, deleted from the main study test or (in the case of partial credit items) have the scoring categories modified.

The fifth stage included the preparation, delivery and scoring of the main study. Preparation occurred from June 2017, with the main study conducted from mid-October to mid-November 2017, and scoring took place in November 2017. Data files for analysis were compiled between January and February 2018. Student background data were collected from schools and education systems during the course of the main study. The assessment survey achieved a nationally representative sample, after removal of exclusions, of 10,324 students from Year 6 and Year 10 (5,439 from Year 6 and 4,885 from Year 10). These students were sampled randomly from 640 schools.

The sixth and final stage involved the analysis of data and writing the reports for the study. This final stage took place from February to July 2018. The publicly available materials developed for NAP–ICT Literacy are:

- this public report containing findings from NAP–ICT Literacy 2017, including comparisons, as appropriate, with findings from previous assessment cycles
- a technical report that provides more detailed information about the processes and analytical procedures applied in the implementation of NAP–ICT Literacy 2017
- a set of school release materials that include sample assessment tasks and scoring guidelines for NAP–ICT Literacy 2017.

2

Assessing ICT literacy

As was the case in previous NAP–ICT Literacy cycles, the assessment of ICT literacy was computer-based and included a seamless combination of simulated and authentic software applications. The assessment as a whole was structured to be congruent with the previous assessments, to provide a basis for comparison with those assessments, and also updated to remain relevant given changes in technology and ICT use over time. This chapter outlines some key features of the NAP–ICT Literacy 2017 assessment. The assessment instrument and the tasks incorporated in that instrument are described with an emphasis on the new tasks and how all the tasks embodied as much authenticity as possible. In addition, the chapter provides information on how the assessment was delivered online, making maximum possible use of school computing resources. Finally, the chapter describes the designed and achieved sample of students who participated in the assessment.

Assessment instrument

The assessment instrument used in NAP–ICT Literacy 2017 was based on the design principles established for NAP–ICT Literacy 2005 and continued through the assessment cycles in 2008, 2011 and 2014. The assessment instrument consisted of seven discrete test modules, each of which could be completed in a maximum of 20 minutes (controlled by the testing software). Each module followed a linear narrative sequence designed to reflect students' typical 'real-world' use of ICT. The modules included a range of school-based and out-of-school-based themes.

All the modules included large tasks to be completed using purpose-built software applications. Four modules were trend modules, as used in at least one of the previous assessment cycles. Three were newly developed for use in the 2017 assessment. The newly developed modules covered skills such as:

- planning for and creating a digital photo book
- using the internet for research
- designing a digital poster about positive online behaviour
- analysing website analytics data
- creating a webpage with a web form.

Each student was administered two trend modules and two new modules appropriate to his or her year level. The modules were randomly assigned to the students.

Trend modules: a basis for measuring change

The four trend modules – Animation Video (from NAP–ICT Literacy 2014), Slide Show (from NAP–ICT Literacy 2014), Technology on the Go (from NAP–ICT Literacy 2014) and Friend's PC (from NAP–ICT Literacy 2008, 2011 and 2014) – were included in the 2017 instrument to enable direct comparisons between the performance of students in 2017 with those of previous cycles of NAP–ICT Literacy. The modules were chosen on the basis that their contents have remained relevant over time, and applied to both Years 6 and 10. The comparability of the student data in response to the tasks with the data provided by students across their previous administrations were confirmed in the Field Trial (see the *NAP–ICT Literacy Technical Report* for more detail of these empirical analyses). Further details about the contents of each of these four trend modules are given below.

- Animation Video: Students used animation software where they employed the use of backgrounds, characters, props and scene transitions to communicate water safety tips around lakes and dams. The audience for the animation video was upper primary school students. Students were required to manage the process of uploading the produced animation video file to a video-sharing website, which required technical and communicative practices, such as privacy settings and naming conventions.
- Slide Show: Students completed a class project about the Tasmanian Devil Program on Maria Island. The module involved opening and saving files, searching websites for information on the topic, creating a short slide show about the Tasmanian Devil Program on Maria Island and scripting notes to go with the slide show.
- Technology on the Go: Students took a borrowed tablet on a two-week school trip to Central Australia. The students were asked to set up the tablet to access the internet, install a number of applications, configure one of the applications to collect weather data and use software to create visualisations of the data.
- Friend's PC: Students were required to complete a series of technical tasks relating to setting up software on a computer, and ultimately make use of a piece of image-editing software to make specified changes to an image. This module focused on software skills reliant on knowledge and application of software and interface design conventions.

New modules: providing for changes in ICT

It addition to enabling comparisons between cycles, it was also important to ensure that the NAP–ICT Literacy assessment instrument referenced more recent developments in the types of software students use. For this reason, three new modules were developed: Poetry and Pictures, School Website and Acceptable Use Agreement.

- Poetry and Pictures: Students were tasked with creating a digital photo book containing poetry and images that focused on a social justice context of raising awareness about homelessness. Students were asked to employ file management and storage practices on an online shared drive, prepare images for use in a digital photo book, and finally transfer content from the online drive to the digital photo book while using software features to control the design and layout of the content.

- School Website: Students were required to analyse website analytics reports to identify problems with a school webpage and make suggestions to improve the website's navigation structure. Finally, students had to create a webpage that promotes a sports event, including the creation of a web form for registration into the sports event.
- Acceptable Use Agreement (Year 10 only): Students were asked to use internet search engines and resources to find information about acceptable-use agreements for schools. Students then reflected on some of the requirements of an agreement, such as the permission required for the distribution of images on social media, and created a digital poster that promotes positive ICT use.

Survey of ICT experience and use

An important aspect to the investigation of ICT literacy outcomes for students is to identify the contexts in which ICT education occurs, as well as measuring students' behaviours and attitudes regarding the use of ICT for schooling and non-schooling purposes. The first cycle of NAP–ICT Literacy in 2005 incorporated a survey asking students to respond to questions on experience using ICT, frequency of use, their use of different types of ICT and attitudes towards ICT. The content of the survey was designed to collect contextual information that complemented the ICT Literacy processes that were described in the NAP–ICT Literacy Assessment Framework.

The NAP–ICT Literacy Working Group worked with ACARA curriculum experts across the subsequent cycles to review and revise the material so that it will remain relevant and reflects changes in ICT use over time. The survey has evolved to collect information on the following topics:

- student experience using ICT
- different types of ICT used, and where they are used
- perceptions of importance and self-efficacy of using ICT
- frequency of using ICT for study, entertainment, communication and technological applications both at school and outside of school
- what ICT applications are used for school-related purposes, how ICT is used in the classroom environment and what ICT-related issues are being taught to students.

In addition to some minor revisions to individual items, several major changes were made to the survey content for NAP–ICT Literacy 2017. These included:

- changing the terminology of 'computers' to 'digital devices', reflecting the evolution of types of ICT commonly used across time
- changing questions on frequency of using ICT 'at home' to how it is used 'outside of school', reflecting the changing nature of how students interact with ICT outside of school
- adding new content, such as items developed to capture information about learning related to computational thinking at school.

The student survey was completed on computer by all Year 6 and Year 10 students immediately following the test. The student survey was designed to be completed by most students in about 20 minutes. Unlike the test, the student survey was not timed, and students could take as long as required to complete the survey.

Assessment administration

The NAP–ICT Literacy 2017 assessment was administered to a sample of students in Year 6 and Year 10 in all states and territories. As was the case in previous NAP–ICT Literacy cycles, external test administrators undertook extensive training in assessment administration procedures and travelled to each school to administer the assessment to the sampled students. The use of external test administrators helped to ensure the smooth operation of the system while also maintaining the high level of data quality and uniformity of participant test experience achieved in previous cycles.

For each test session, sampled students were withdrawn from regular classes and completed the assessment in a designated area of the school where the computer equipment was located. Test administrators usually administered the assessment to groups of 20 students in one test session during the school day. For reasons of resourcing or school preference, however, it was sometimes necessary to run the assessment in two successive sessions with two groups of 10 students completing the assessment. The administration of the assessment took place between 16 October and 10 November 2017.

Flexible administration

Flexible administration was a practice initiated in NAP–ICT Literacy 2011 in a small number of very remote schools. It was initiated to take account of the distances involved in accessing these schools, to better target the instrument and to provide opportunity to maximise participation rates in those schools. The provisions included modifications to the assessment and to the method of administration.

For NAP–ICT Literacy 2017, flexible administration was undertaken in eight schools in very remote locations. For these schools, the number of modules to be completed by each student was reduced from four to two and the timer was removed from the application to allow students additional time to complete the tasks. Teachers – rather than test administrators – administered the assessment to the sampled students. Teachers in flexible administration schools were permitted to read the instructions and questions to students (similar to the provision in the regular delivery for test administrators to read instructions and questions to students requiring support). In order to maximise student participation, teachers were able to administer the assessment to small groups of students or to individuals when it was possible and appropriate over a period of several weeks.

Teachers tasked with administering the assessment were trained in specific NAP–ICT Literacy assessment administration procedures and were provided with a detailed manual

and script for use during the assessment session. A support service was also maintained for these teachers via a 1800 number and dedicated email address.

Delivery method

Assessment system in 2017

All participating schools undertook the NAP–ICT Literacy 2017 assessment via an online delivery system. Students used either desktop or laptop devices that were provided by the school (or in some cases, by the students themselves[1]), and were connected to the internet via either a wired or wireless connection. In preparation for the actual assessment, schools carried out an online 'technical readiness test' (TRT) on a sample of assessment-designated computers, in order to check that devices met minimum assessment specifications. A technical support service provided schools with troubleshooting assistance in the lead-up to the assessment, to solve any technical issues in a timely manner and to ensure the smooth running of the assessment on test day. During the assessment period, this technical support service was also available to respond to any technical issues that arose during the conduct of the assessment.

Consistency of the assessment experience over time

The NAP–ICT Literacy data require students to have the same test-taking experience (speed, screen display, time allowed, etc.) in order to enable comparisons of student achievement within and across the assessment cycles. While the test development team made improvements to the user interface for the 2017 assessment, the overall user experience for participating students remained consistent with previous cycles. The student screen had three main sections: a surrounding border of test-taking information and navigation facilities; a central information section that contained stimulus materials for students to read or (simulated or live) software applications; and a lower section containing the instructional and interrogative text of the assessment items and the response areas for multiple-choice and short answer response items. The assessment items were presented in a linear sequence to students. As in previous cycles, students were not permitted to return to previously completed items because in some cases later items in a sequence provided clues or even answers to earlier items. The administration for each student involved completing a tutorial of 10 minutes (which provided an introduction to the system as well as a series of practice questions), four test modules each lasting up to 20 minutes, and the 20-minute student survey. Provision was also made for four 5-minute breaks between test modules.

[1] The use of either school- or student-provided devices depended on the device-use policies in effect at each participating school.

Sample

Sample design

As for previous NAP–ICT Literacy cycles, the 2017 sample design involved a two-stage process aimed at obtaining reliable estimates of ICT literacy that were representative of the Year 6 and Year 10 student populations in all Australian states and territories. Sampling procedures followed established NAP sample assessment processes, which were designed to minimise any potential bias and to maximise the precision of estimates.

The first stage of sampling involved selecting schools within explicit strata[2] formed by state or territory and school sector. Within each explicit stratum, the geographic location, a school measure of socio-economic status[3], and school size were all used for implicit stratification.[4] A school's probability of selection was proportional to the number of students enrolled in the relevant year level (either Year 6 or Year 10), which meant that schools with larger numbers of students at the relevant year level were more likely to be selected for participation.

Two samples of replacement schools were also drawn to enable the sample size and representativeness to be maintained if initially sampled schools were unable to participate. The replacement schools were selected to be as similar as possible in size, jurisdiction and sector to the schools for which they were replacements. Use of replacement schools, however, was kept to an absolute minimum in order to retain the integrity of the original sample as much as possible.

Schools excluded from the target population included non-mainstream schools (such as schools for students with intellectual disabilities), very remote schools (in all states except the Northern Territory[5]) and in schools with fewer than five students at the target year level.

The second stage of sampling comprised the drawing of a random sample of 20 students from the target year level in each sampled school. Where fewer than 20 eligible students were enrolled in the target grade (that is, in small schools), all students were selected to participate.

In each of the sampled schools, individual students were able to be exempted from the assessment based on the following criteria:

- Functional disability: The student had a moderate to severe permanent physical disability such that they could not perform in the assessment situation.

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[2] Explicit stratification means that separate school samples were drawn for each sector within each jurisdiction.

[3] The Australian Bureau of Statistics' (ABS) Index of Education and Occupation was used. This is one of the ABS Socio-Economic Indexes for Areas (SEIFA).

[4] Implicit stratification means that, within the sampling frame, schools were grouped and sorted by implicit stratification variables so that adjacent schools were similar to each other.

[5] Very small schools were included in the Northern Territory sample to better reflect its whole school population. Further details are provided in the *NAP–ICT Literacy 2017 Technical Report*.

- Intellectual disability: The student had a mental or emotional disability and cognitive delay such that they could not perform in the assessment situation.
- Limited assessment language proficiency: The student was unable to read or speak the language of the assessment (English) and would be unable to overcome the language barrier in the assessment situation. Typically, a student who had received less than one year of instruction in English would be excluded.

More information about the sampling design and its implementation, including school and student exclusions, is provided in the *NAP–ICT Literacy 2017 Technical Report*.

Achieved sample

Table 2.1 presents the numbers of schools and students in both the total and achieved samples. The total sample refers to those schools and students originally sampled using the sampling procedures described previously, after the removal of any school-level exclusions. The achieved sample denotes the number of schools and students that actually participated in the assessment.

Nationally, participation rates were 0.89 for Year 6 and 0.81 for Year 10.[6] More detailed information about participation rates is provided in the *NAP–ICT Literacy 2017 Technical Report.*

Table 2.1 Numbers of students and schools in the target and achieved samples

	Year 6				Year 10			
	Schools		Students		Schools		Students	
State/ territory	Total sample	Achieved sample	Total sample	Achieved sample	Total sample	Achieved sample	Total sample	Achieved sample
NSW	51	51	1015	910	49	49	980	813
Vic.	51	50	996	842	50	50	1000	783
Qld	51	50	987	865	49	48	980	769
WA	46	45	879	756	50	49	1000	807
SA	48	48	918	763	50	49	967	726
Tas.	43	43	791	690	34	34	666	526
ACT	20	20	385	340	21	21	420	316
NT	21	20	375	273	15	13	260	145
Aust.	331	327	6346	5439	318	313	6273	4885

[6] These response rates are still under review, but should be close to the final response rates.

Participating sample characteristics

As per established NAP protocols, schools and education systems were required to provide background data for each of the participating students. The specific student background variables collected for NAP–ICT Literacy were age, gender, Indigenous status, parental occupation, parental education, main language spoken at home, country of birth and geographic location. The structure of these student background variables follows NAP protocols as set out in the Data Standards Manual (ACARA, 2017).

While the relationships between student background characteristics and ICT literacy achievement are explored more fully in the next chapter, some preliminary descriptive analyses[7] of the student background data are presented and examined here.

Table 2.2 represents the background characteristics of the Year 6 and Year 10 students who participated in the NAP–ICT Literacy assessment. Two sets of percentages are reported for each background variable by year level. The first column denotes the various percentages for all participating students (including those with missing data for a given background variable), while the second column provides these figures based only on students with a valid response to the background variable being examined.

[7] With regard to the analyses conducted for this report, all statistics are weighted unless otherwise stated. Weighting of data allows inferences to be made about the national Year 6 and Year 10 student populations.

Table 2.2 Distribution of student background characteristics (weighted)

Student background characteristics	Year 6		Year 10	
	All students (%)	Students with valid responses (%)	All students (%)	Students with valid responses (%)
Student gender				
Boy	52	52	53	53
Girl	48	48	47	47
Total	**100**	**100**	**100**	**100**
Missing	0	-	0	-
Parental occupation				
Senior managers and professionals	27	30	25	28
Other managers and associate professionals	23	25	24	26
Tradespeople and skilled office, sales and service staff	22	23	22	24
Unskilled labourers, and office, sales and service staff	13	14	13	14
Not in paid work for 12 months	8	8	8	8
Total	**93**	**100**	**92**	**100**
Missing	7	-	8	-
Parental education				
Year 9 or equivalent or below	2	2	3	3
Year 10 or equivalent	4	4	4	4
Year 11 or equivalent	2	2	3	3
Year 12 or equivalent	7	8	8	8
Certificates I–IV (including trade certificates)	26	28	26	28
Advanced diploma/diploma	14	15	14	15
Bachelor degree or above	39	41	36	39
Total	**95**	**100**	**92**	**100**
Missing	5	-	8	-
Indigenous status				
Non Aboriginal or Torres Strait Islander	94	95	94	96
Aboriginal or Torres Strait Islander	5	5	3	4
Total	**99**	**100**	**98**	**100**
Missing	1	-	2	-
Language spoken at home				
English only	75	78	71	72
Language other than English	22	22	27	28
Total	**96**	**100**	**97**	**100**
Missing	4	-	3	-
Country of birth				
Born in Australia	88	88	81	82
Not born in Australia	12	12	18	18
Total	**100**	**100**	**100**	**100**
Missing	0	-	0	-
Geographic location				
Metropolitan	71	71	71	71
Provincial	27	27	28	28
Remote	1	1	1	1
Total	**100**	**100**	**100**	**100**
Missing	0	-	0	-

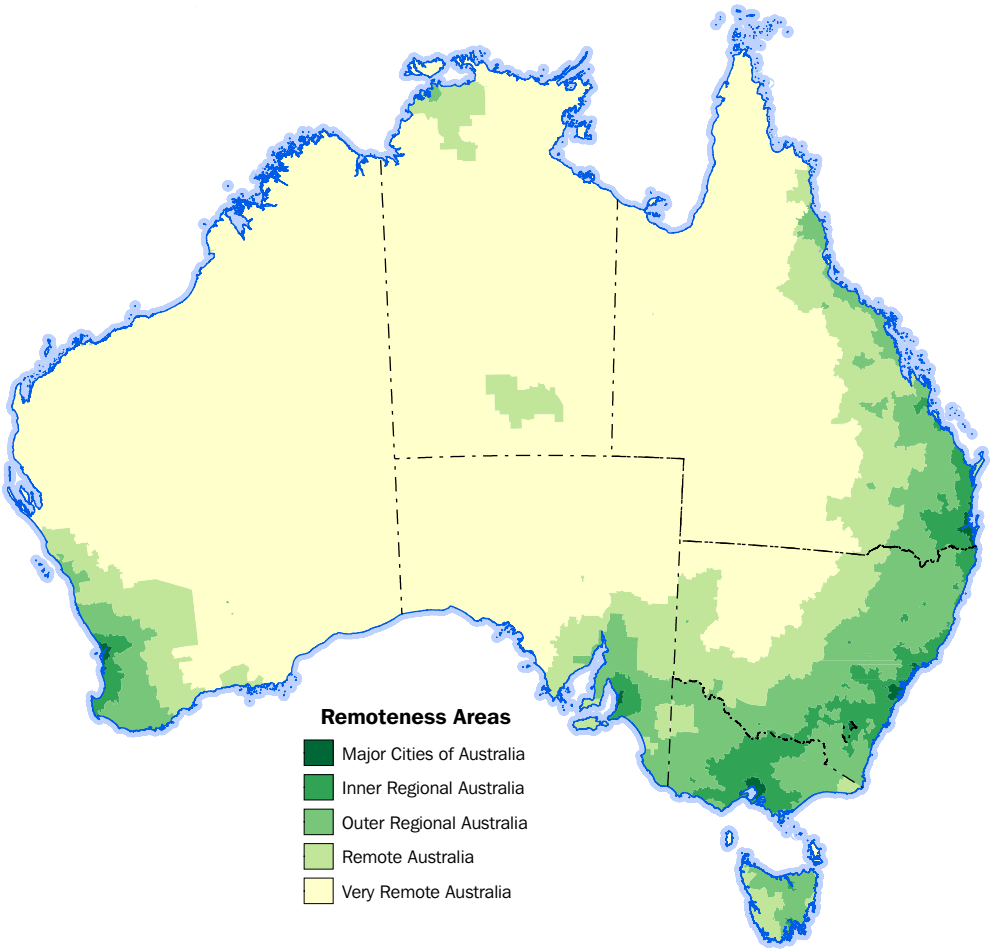
As was the case for previous cycles, the parental occupation and parental education variables showed the highest levels of missing data. This was particularly marked at a Year 10 level, with 8 per cent of these data missing. It should be noted, however, that this demonstrates a reduction of missing data from the previous cycle of approximately 3 percentage points for these variables. Similar, though less substantial, improvements in data availability were also seen across the majority of other background variables reported in this chapter.

With regard to the parental occupation and the parental education variables, schools and educational authorities were asked to provide data about the occupational groups of parents or guardians of all students and the highest level of non-school education achieved by the parents or guardians of participating students. For the purposes of reporting, parental occupation and parental education were both presented as combined variables that represented the highest parental occupation or education group indicated by either parent or guardian.

For the purposes of this report, geographic location refers to whether a student attended school in a metropolitan, regional or remote zone. The constituent areas that comprise each zone are informed by the Australian Statistical Geography Standard (ASGS) Remoteness Structure, whereby:

i. metropolitan zones include all major cities of Australia
ii. regional zones include all inner regional and outer regional areas in Australia
iii. remote zones include all remote and very remote areas in Australia.

A map of the 2016 remoteness areas is provided in Figure 2.1.



Source: Australian Bureau of Statistics

Figure 2.1 Map of the 2016 remoteness areas for Australia

Calculating the precision of estimates

For any sample survey, there is a level of uncertainty regarding the extent to which an estimate measured from the sample of students is the same as the true value for the population (that is, all students). An estimate derived from a sample is subject to uncertainty because data from the sample may not reflect the population precisely. Throughout this report, data are reported with confidence intervals that comprise the range within which, based on the data, one can have 95 per cent confidence the true value of the reported figure is located. The magnitude of the confidence intervals varies depending on the exact ways in which the data have been collected. For example, in this report, larger confidence intervals are consistently seen around estimates based on smaller numbers of students (such as from the smaller states and territories). Details of how the confidence intervals are calculated can be found in the *NAP–ICT Literacy 2017 Technical Report.*

The size of differences

In large samples, it is possible that relatively small differences are statistically significant even if the differences themselves have little educational importance. In this report, the term 'significant' refers only to differences that are statistically significant. If a difference is significant, the size of the difference (the effect size) can be considered. Effect size is useful when considering the differences between measured scores (such as NAP–ICT Literacy scale scores or survey scale scores) across groups.

Effect size provides a comparison of the difference in average scores between two groups with reference to the degree in which the scores vary within the groups. When the effect size is large, it means that the difference between average scores is large relative to the spread of the scores, and could therefore be considered as 'important'. Conversely, when the effect size is small, it means that the observed difference is relatively small compared with the spread of the scores and thus arguably less 'important'. The effect size is the difference between group means divided by the standard deviation. We use fractions for approximate estimates. Following the precedent of other NAP sample assessments and the spread of significant mean differences in NAP–ICT Literacy, this report has adopted the following categories as descriptors:

- effect sizes over 1 are regarded as very large (or very strong associations)
- effect sizes above 0.5 are large effects (or strong associations)
- effect sizes above 0.3 are moderate effects (or moderate associations)
- effect sizes above 0.1 are regarded as indicating small effects (or weak associations).

Descriptors relating score point differences to standard deviations are used in the report when regarded as informative.

The NAP–ICT Literacy achievement scale was established with a Year 6 standard deviation of 100 points. Consequently, a moderate effect on the NAP–ICT Literacy scale corresponds to approximately 30 scale points (equivalent to the average learning growth of about one year between Years 6 and 10). For the survey scales, a moderate effect is approximately three scale points given that the Year 6 standard deviation was set at 10 scale points.

3

ICT literacy achievement

Chapter highlights

- Slightly more than half of the Year 6 and of the Year 10 students performed at or above the proficient standard.
- After a decrease in performance at both year levels between 2011 and 2014, achievement did not change significantly between 2014 and 2017.
- Female students showed significantly higher ICT literacy than male students, consistent with findings from previous cycles.
- The gap between Indigenous and non-Indigenous students remained significant and very large in 2017.
- A significant difference was found this cycle for Year 6 between students speaking only English at home and students speaking another language, in the advantage of students speaking another language at home.
- A significant difference was recorded in the current cycle for Year 10 between students born in Australia and students born overseas, in the advantage of the students born in Australia.
- ICT literacy achievement gradually increased with increasing levels of parental occupation and parental education resulting in large, significant differences between the highest and the lowest occupational and educational groups.

Developing the NAP–ICT Literacy scale

The NAP–ICT Literacy scale was established on the basis of the test contents and psychometric data collected during the inaugural NAP–ICT Literacy assessment in 2005. The scale comprises six achievement levels that are used to describe the achievement of students in both Year 6 and Year 10. The scale descriptors have been reviewed following each subsequent cycle of NAP–ICT Literacy to ensure the accurate reflection of the NAP–ICT Literacy test contents.

The empirical scale

The Rasch Item Response Theory (IRT) model was used to establish the empirical component of the scale. This is the same model that has also been used to establish the empirical scales in the National Assessment Program – Science Literacy (NAP–SL), Civics and Citizenship (NAP–CC), and in the National Assessment Program – Literacy and Numeracy (NAPLAN). More information about the scaling model and procedures is provided in the *NAP–ICT Literacy 2017 Technical Report*.

The 2017 NAP–ICT Literacy test includes a proportion of test questions that were used in the 2014 test (and in tests from previous NAP–ICT cycles). Common questions were also included between the assessments of Year 6 and Year 10 in 2017 and in all previous NAP–ICT cycles. In 2005, data from the common questions at Year 6 and Year 10 were used to establish a single NAP–ICT Literacy scale, which was used to report achievement across both year levels. In 2008, 2011 and 2014, data from the common items between year levels and across assessment cycles were used to derive comparable student achievement scores on the established NAP–ICT Literacy scale. The scale was set in 2005, with a mean score of 400 and standard deviation of 100 scale points for the national Year 6 sample. NAP–ICT Literacy scale scores from all four assessment cycles are reported on this same metric.

The achievement levels

Six achievement levels were established at equally spaced intervals across the NAP–ICT Literacy scale in 2005. Each achievement level spans 120 scale points. Each level description provides a synthesised overview of the knowledge, skills and understandings that a student working within the level is able to demonstrate. The levels are set so that a student with an achievement scale score at the bottom of a level has a 62 per cent chance of correctly answering any question at the bottom of that level, a 38 per cent chance of correctly answering any question at the top of that level, and would be expected to correctly answer about half of the questions in a set of questions evenly spaced across the level. The cut-points for the achievement levels are shown in Figure 3.1.

	Cut-point in scale score
Level 6	
	769
Level 5	
	649
Level 4	
	529
Level 3	
	409
Level 2	
	289
Level 1	

Figure 3.1 Cut-points for achievement levels

Describing the NAP–ICT Literacy scale

Summary descriptions for all six levels were established in 2005 based on expert judgements of the contents of the questions situated within each level. These descriptions were confirmed against the new test content developed for each new assessment cycle. Broadly, the level descriptors included reference to the three strands of the progress map in the NAP–ICT Literacy Assessment Framework.

Across the six achievement levels, the descriptors refer to: information search and evaluation, software applications in terms of their functions and features (rather than specific software products), and aspects of appropriate and ethical use of ICT. As a consequence, the descriptors have continued to be relevant and applicable to demonstrations of ICT literacy achievement even though different software contexts have evolved over the five cycles of NAP–ICT Literacy. The assessment modules, and the tasks those modules contain, were updated to reflect new software contexts and applications, but the underlying conceptualisation of ICT literacy measured in NAP–ICT Literacy has remained constant.

This principle is followed in most assessment studies that extend over several cycles and are concerned with measuring change. It is accepted that changes in methods and content are necessary for assessments to remain relevant, but that maintaining the meaning of the construct is a necessary condition for measuring change (von Davier & Mazzeo, 2009).

The NAP–ICT Literacy scale represents a hierarchy of the knowledge, skills and understanding included in the construct of ICT literacy. Overall, higher levels on the scale refer to more complex applications of knowledge, skills and comprehension in ICT literacy. The scale is developmental in the sense that students are assumed to be typically able to demonstrate achievement of the skills and cognition described in the scale below, as well as at, their measured level of achievement.

Table 3.1 shows the described NAP–ICT Literacy scale together with examples of student achievement at each achievement level. The proficient standards and student achievement in relation to the achievement levels are discussed in the following sections.

Table 3.1 NAP–ICT Literacy achievement level descriptions with examples

Achievement level	Achievement level description	Examples of student achievement at this level
Level 6	Students working at level 6 create information products that show evidence of technical proficiency and careful planning and review. They use software features to organise information and to synthesise and represent data as integrated complete information products. They design information products consistent with the conventions of specific communication modes and audiences, and use available software features to enhance the communicative effect of their work.	• Create an information product in which the flow of information is clear, logical and integrated to make the product unified and complete. • Select appropriate key points and data from available resources and use their own words to include and explicate them in an information product. • Use graphics and text software editing features, such as font formats, colour, animations and page transitions, in ways that enhance the structure and communicative purpose of an information product. • Include relevant tables and charts to enhance an information product and support these representations of data with text that clearly explains their purpose and contents.
Level 5	Students working at level 5 evaluate the credibility of information from electronic sources and select the most relevant information to use for a specific communicative purpose. They create information products that show evidence of planning and technical competence. They use software features to reshape and present information graphically consistent with presentation conventions. They design information products that combine different elements and accurately represent their source data. They use available software features to enhance the appearance of their information products. They employ file management practices to support workflow management when creating information products.	• Create an information product in which the information flow is clear and logical and the tone and style are consistent and appropriate to a specified audience. • Use video/animation editing techniques to control the timing of events and transitions to create a sense of continuity. • Select and include information from electronic resources in an information product to suit an explicit communicative purpose. • Use graphics and text software editing features such as font formats, colour and animations consistently within an information product to suit a specified audience. • Create tables and charts that accurately represent data and include them in an information product with text that refers to their contents. • Apply specialised software and file management functions such as using the history function on a web browser to return to a previously visited page or moving and organising image files into a dedicated folder for the purpose of importing the images into an application. • Explain the advantages and disadvantages of saving documents as PDFs.

Table 3.1 (continued)

Level 4	Students working at level 4 generate well-targeted searches for electronic information sources and select relevant information from within sources to meet a specific purpose. They create information products with simple linear structures and use software commands to edit and reformat information products in ways that demonstrate some consideration of audience and communicative purpose. They recognise situations in which ICT misuse may occur and explain how specific protocols can prevent this.	• Create an information product in which the flow of information is clear and the tone is controlled to suit a specified audience. • Generate searches that target relevant resources, apply search engine filtering parameters to improve search results and then select relevant sections of these resources to include, with some modification and supporting text, in an information product. • Apply graphics and text software editing features, such as font formats, colour and image placement, consistently across a simple information product. • Apply specialised file management and software functions, such as sorting files by type and date, locating an appropriate folder location for software installation or enabling a specified hidden toolbar in a word processor.
Level 3	Students working at level 3 generate simple general search questions and select the best information source to meet a specific purpose. They retrieve information and interpret data reports from given electronic sources to answer specific, concrete questions. They assemble information in a simple linear and logical order to create information products. They use conventionally recognised software commands to edit and reformat information products. They recognise common examples in which ICT misuse may occur and suggest ways of avoiding them.	• Create an information product that follows a prescribed explicit structure. • Identify the difference between paid and non-paid search engine generated results when conducting research. • Select clear, simple, relevant information from given information sources and include it in an information product. • Make recommendations to improve the navigability of a website. • Identify a potential problem with a website based on a web traffic report. • Use graphics and text software editing features to manipulate aspects such as colour, image size and placement in simple information products. • Apply software and file management functions using common conventions such as left aligning selected text, adding questions to an online survey, or creating and naming a new file on the desktop. • Recognise the potential for ICT misuse, such as plagiarism, computer viruses, and deliberate identity concealment, and suggest measures to protect against them.

Table 3.1 (continued)

Level 2	Students working at level 2 locate simple, explicit information from within a given electronic source. They add content to and make simple changes to existing information products when instructed. They edit information products to create products that show limited consistency of design and information management. They recognise and identify basic ICT electronic security and health and safety usage issues and practices.	• Locate explicit relevant information or links to information from within a webpage. • Use metadata, such as date, to help identify and select relevant files. • Make changes to some presentation elements in an information product. • Apply simple software and file management functions, such as copying and pasting information from one column of a spreadsheet to another column or adding a webpage to a list of favourites (bookmarks) in a web browser or opening an email attachment. • Recognise common computer-use conventions and practices, such as the use of the '.edu' suffix in the URL of a school's website, the need to keep virus protection software up-to-date and the need to maintain good posture when using a computer. • Explain the purpose of specific school ICT use and social media use policies.
Level 1	Students working at level 1 perform basic tasks using computers and software. They implement the most commonly used file management and software commands when instructed. They recognise the most commonly used ICT terminology and functions.	• Apply graphics editing software functions, such as adding and moving predefined shapes and adjusting property sliders to control the basic appearance of an image. • Apply basic file and computer management functions, such as opening, and dragging and dropping files on the desktop. • Apply generic software commands, such as the 'save as' and 'paste' functions, clicking on a hyperlink to go to a webpage, or selecting all the text on a page. • Recognise basic computer-use conventions, such as identifying the main parts of a computer and that the 'shut-down' command is a safe way to turn off a computer.

The proficient standards

One of the purposes of the NAP sample assessments (in NAP–ICT Literacy, Civics and Citizenship and Science Literacy) is to monitor and report on student attainment of key performance measures (KPMs) defined for each area. The proportion of students achieving at or above the proficient standard for each of Year 6 and Year 10 is the national KPM for ICT literacy specified in the Measurement Framework for Schooling in Australia (ACARA, 2015).

The proficient standards "represent a 'challenging but reasonable' expectation of student achievement at a year level with students needing to demonstrate more than elementary skills expected at that year level" (ACARA, 2015, p. 5). This is different from the definition

of either a benchmark or a National Minimum Standard, which refers to minimum competence. The proficient standards in NAP–ICT Literacy (one for Year 6 and one for Year 10) were established as a result of consultations with ICT experts and representatives from all states and territories and all school sectors as part of the inaugural assessment in 2005. The standards-setting group included practising teachers with specific ICT expertise, ICT curriculum experts and educational assessment experts. The procedures followed by the group are outlined in the NAP–ICT Literacy Public Report (MCEETYA, 2007, pp. 46–7).

The proficient standard for Year 6 and the proficient standard for Year 10 were established in 2005 on the NAP–ICT Literacy scale. The proficient standard for Year 6 is 409 scale points, which is the boundary between levels 2 and 3 on the NAP–ICT Literacy scale. The proficient standard for Year 10 is 529 scale points, which is the boundary between levels 3 and 4 on the scale. Year 6 students performing at level 3 and above and Year 10 students performing at level 4 and above have consequently met or exceeded their relevant proficient standard.

Student achievement at the national level

In each of the following sections, results are first described for 2017 before they are compared with results from previous cycles (where appropriate). The percentages of students attaining the proficient standard (the KPM) are presented first in each section, followed by distributions of students across achievement levels and average student scores on the NAP–ICT Literacy scale. All results are presented with 95 per cent confidence intervals, meaning that whenever results are described as significant, the findings are statistically significant at the 0.05 level.

When comparing performance over time, results are presented both in percentage of students attaining the proficient standard and in mean performance. Tests of statistical significance are only performed on differences in mean performance, because this statistic is more sensitive for detecting significant changes.

Achievement by year level in 2017

Fifty-three per cent of Year 6 students and 54 per cent of Year 10 students met or exceeded the relevant proficient standard for NAP–ICT Literacy in 2017.

The percentages of students demonstrating proficiency at each achievement level in Year 6 and Year 10 are presented in Table 3.2. These percentages are also displayed graphically in Figure 3.2, together with the location of the proficient standard for each year level. Table 3.7 records the distribution of students across achievement levels for each jurisdiction.

Table 3.2 Percentages of Year 6 and Year 10 students at each achievement level in 2017

Achievement level	Year 6		Year 10	
Level 6			0	(±0.1)
Level 5	0	(±0.2)	8	(±1.3)
Level 4	13	(±1.4)	46	(±2.6)
Level 3	41	(±1.9)	33	(±2.5)
Level 2	33	(±2.2)	10	(±1.5)
Level 1	13	(±1.6)	3	(±1.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

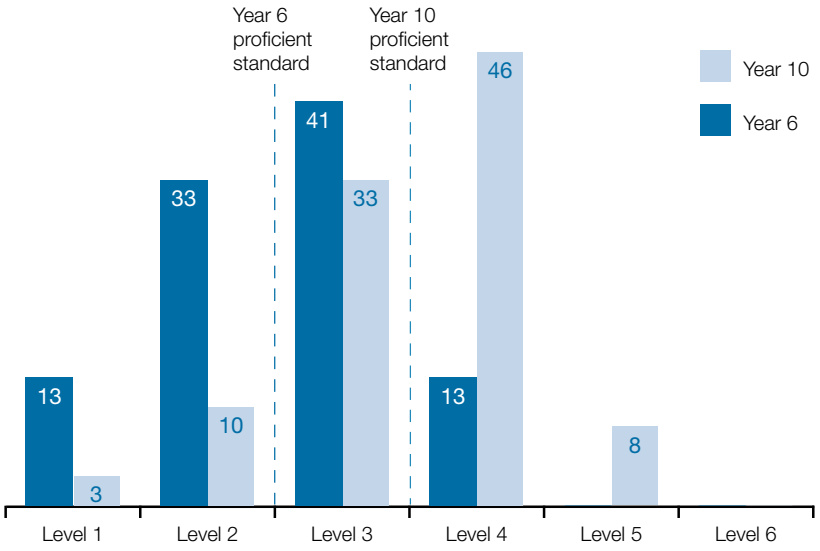


Figure 3.2 Percentages of Year 6 and Year 10 students across achievement levels in 2017

Figure 3.2 shows that there is a concentration of student achievement at Year 6 in levels 2 and 3, with 74 per cent of Year 6 students achieving within these two levels. At Year 10, the concentration of achievement was at levels 3 and 4, with 78 per cent of students achieving within these two levels. Figure 3.2 shows that the distribution of achievement of Year 10 students is centred approximately one achievement level above that of Year 6. Figure 3.2 also illustrates the overlap in achievement between Year 6 and Year 10. This overlap is most concentrated at level 3, with 41 per cent of Year 6 students and 33 per cent of Year 10 students.

In 2017, the average achievement score for Year 6 students was 410 scale points, and 523 scale points for Year 10 students: a difference of 113 scale points between the year levels. This difference of 113 scale points is statistically significant and is approximately equivalent to the width of an achievement level on the NAP–ICT Literacy scale.

The averages, their confidence intervals and selected percentiles are presented in Figure 3.3. The 90th percentile gives the value above which the highest 10 per cent of students scored, the 75th gives the value above which the highest 25 per cent of students scored, and so on. The scale difference in the scale scores associated with equivalent percentiles between Year 6 and Year 10 was consistent across the scale (about one achievement level, or between 100 and 120 score points). This shows that in broad terms the shape of the distributions of Year 6 and Year 10 student achievement across the scale are similar but separated by an amount equivalent to the difference in the average scores between Year 10 and Year 6. Figure 3.3 also shows that the average Year 6 student performs at the top of level 2 or at the bottom of level 3. The average Year 10 student performs at the top of level 4.

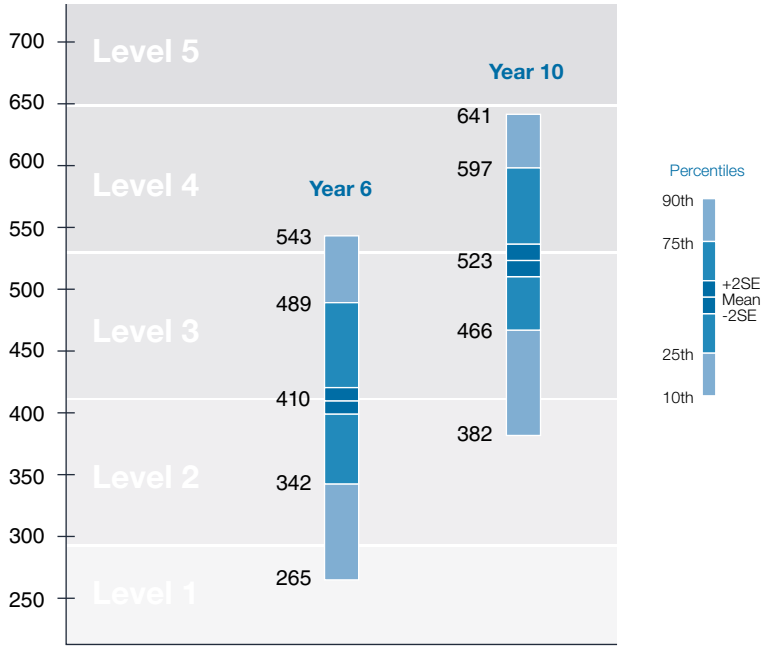


Figure 3.3 NAP–ICT Literacy average scale scores and distributions for Year 6 and Year 10 in 2017

Changes in achievement since 2005

Table 3.3 shows the percentage of students at or above the proficient standard for Year 6 and Year 10 across the five assessment cycles. Compared with the previous assessment in 2014, no significant changes were recorded in the percentage of students attaining the proficient standard.

Table 3.3 Percentages of Year 6 and Year 10 students attaining the proficient standard since 2005

Year	2017	2014	2011	2008	2005
Year 6	53 (±2.4)	55 (±2.5)	▲ 62 (±2.0)	57 (±2.8)	49 (±3.0)
Year 10	54 (±3.0)	52 (±2.5)	▲ 65 (±2.3)	▲ 66 (±3.0)	61 (±3.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

The percentage of Year 6 students achieving the standard in 2017 was significantly lower than in 2011. For Year 10 students, the percentage attaining the standard in 2017 was significantly lower than it was in both 2008 and 2011.

Table 3.4 shows the percentages of Year 6 and Year 10 students in each achievement level across the five assessment cycles. The percentages of students within each level in 2017 were equivalent to the percentages in 2014.

Table 3.4 Percentages of Year 6 and Year 10 students at each achievement level since 2005

Achievement level		2017	2014	2011	2008	2005
Year 6	Level 6	0 (±0.0)	0 (±0.0)	0 (±0.1)	0 (±0.1)	0 (±0.1)
	Level 5	0 (±0.2)	1 (±0.3)	1 (±0.6)	1 (±0.5)	0 (±0.1)
	Level 4	13 (±1.4)	13 (±1.3)	20 (±1.8)	15 (±1.6)	8 (±1.5)
	Level 3	41 (±1.9)	42 (±2.5)	40 (±2.0)	41 (±2.3)	41 (±2.7)
	Level 2	33 (±2.2)	31 (±2.4)	27 (±1.7)	30 (±2.1)	39 (±2.3)
	Level 1	13 (±1.6)	14 (±1.9)	11 (±1.6)	13 (±1.7)	13 (±1.5)
Year 10	Level 6	0 (±0.1)	0 (±0.3)	2 (±0.6)	1 (±0.6)	0 (±0.4)
	Level 5	8 (±1.3)	9 (±1.3)	19 (±1.6)	18 (±2.1)	12 (±1.7)
	Level 4	46 (±2.6)	43 (±2.0)	44 (±2.4)	47 (±3.0)	49 (±2.7)
	Level 3	33 (±2.5)	33 (±2.1)	25 (±1.8)	26 (±2.2)	32 (±2.9)
	Level 2	10 (±1.5)	11 (±1.4)	8 (±1.1)	7 (±1.5)	6 (±1.2)
	Level 1	3 (±1.0)	4 (±1.1)	2 (±0.7)	2 (±0.5)	0 (±0.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole numbers, some totals may appear inconsistent.

Table 3.5 compares the average NAP–ICT Literacy achievement of Year 6 and Year 10 students from 2005 to 2017. It shows the average performance on the ICT Literacy scale for Years 6 and 10 across the five cycles of NAP–ICT Literacy since 2005.

Table 3.5 ICT literacy average scales scores for Year 6 and Year 10 since 2005

Year	2017	2014	2011	2008	2005
Year 6	410 (±5.4)	413 (±5.7)	▲ 435 (±5.7)	419 (±6.9)	400 (±6.3)
Year 10	523 (±6.6)	520 (±6.7)	▲ 559 (±5.7)	▲ 560 (±7.1)	▲ 551 (±5.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

The average performance of Year 6 and Year 10 students did not change between 2014 and 2017. This means that the average performance, after a significant decline between 2011 and 2014, did not further decrease, but did not increase either. The difference in average performance between Year 6 and Year 10 has remained approximately one achievement level over all five cycles.

Student achievement among the states and territories

This section includes a comparison of jurisdictional results across the NAP–ICT Literacy cycles since 2005.

Comparisons of 2017 student achievement among the states and territories

Table 3.6 shows the percentages of students attaining the proficient standard for each state and territory. The percentage attaining the proficient standard ranged from 35 in the Northern Territory to 65 in the ACT. In comparison, only one-third of Year 6 students achieved the standard in the Northern Territory, which was the lowest performing jurisdiction at both year levels. For Year 10, the percentage ranged from 27 per cent in the Northern Territory to 62 per cent in Western Australia.

Table 3.6 Percentages of Year 6 and Year 10 students attaining the proficient standard nationally and by state and territory in 2017

State/territory	Year 6		Year 10	
NSW	51	(±4.2)	57	(±6.8)
Vic.	62	(±4.5)	55	(±5.0)
Qld	47	(±5.8)	47	(±6.6)
WA	54	(±4.5)	62	(±4.0)
SA	53	(±6.5)	56	(±4.6)
Tas.	49	(±5.9)	39	(±5.6)
ACT	65	(±8.4)	54	(±8.4)
NT	35	(±11.5)	27	(±8.4)
Aust.	53	(±2.4)	54	(±3.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table 3.7 shows the percentages of Year 6 and Year 10 students at achievement levels 1 to 6 across the states and territories. While some differences in percentages appear large between states and territories, the uncertainties in the estimated percentages (that is, the confidence intervals) are large as well. The percentages and differences among them need to be interpreted with caution and are only included for descriptive purposes in this report.

Table 3.7 Percentages of Year 6 and Year 10 students at each achievement level nationally and by state and territory in 2017

Year 6								
State/territory	Level 1		Level 2		Level 3		Level 4 or above	
NSW	15	(±3.6)	34	(±3.7)	39	(±3.5)	13	(±2.4)
Vic.	8	(±2.1)	30	(±3.8)	45	(±4.3)	17	(±3.9)
Qld	15	(±4.0)	38	(±5.2)	37	(±4.6)	11	(±3.4)
WA	14	(±3.5)	32	(±3.8)	44	(±4.3)	10	(±2.2)
SA	16	(±4.2)	31	(±6.0)	41	(±5.8)	12	(±3.2)
Tas.	19	(±4.5)	32	(±5.4)	39	(±6.0)	10	(±2.8)
ACT	9	(±3.5)	27	(±8.2)	48	(±6.9)	17	(±6.7)
NT	35	.(±14.6)	30	(±5.4)	30	(±10.0)	5	(±5.3)
Aust.	13	(±1.6)	33	(±2.2)	41	(±1.9)	13	(±1.5)

Year 10										
State/territory	Level 1		Level 2		Level 3		Level 4		Level 5 or above	
NSW	3	(±2.6)	10	(±3.1)	30	(±4.6)	46	(±6.0)	11	(±3.1)
Vic.	2	(±1.1)	9	(±2.4)	33	(±4.4)	47	(±4.2)	8	(±3.2)
Qld	5	(±2.2)	12	(±3.5)	36	(±5.3)	42	(±5.7)	5	(±2.3)
WA	2	(±1.4)	7	(±2.2)	29	(±3.1)	54	(±3.8)	8	(±2.8)
SA	3	(±1.7)	11	(±3.2)	31	(±4.3)	49	(±4.5)	7	(±2.9)
Tas.	8	(±3.1)	13	(±2.9)	40	(±4.5)	36	(±5.3)	3	(±1.6)
ACT	4	(±2.5)	8	(±3.0)	33	(±6.4)	41	(±6.1)	13	(±4.6)
NT	14	(±7.6)	18	(±8.5)	40	(±7.9)	25	(±9.5)	3	(±3.5)
Aust.	3	(±1.0)	10	(±1.5)	33	(±2.5)	46	(±2.6)	8	(±1.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole numbers, some totals may appear inconsistent.

Table 3.8 records the average NAP–ICT Literacy scores at both year levels across jurisdictions. There is some variation in the 95 per cent confidence intervals and therefore level of precision across states and territories, resulting from variation in sample sizes as well as variation in test performance across the jurisdictions (see chapter 2 for more details on sample sizes and sample participation rates).

Table 3.8 NAP–ICT Literacy average scale scores nationally and by state and territory for Year 6 and Year 10 in 2017

State/territory	Year 6		Year 10	
NSW	404	(±11.9)	531	(±16.4)
Vic.	432	(±9.4)	530	(±10.6)
Qld	399	(±12.4)	505	(±13.1)
WA	406	(±10.3)	539	(±10.4)
SA	405	(±14.9)	524	(±11.0)
Tas.	390	(±12.9)	480	(±13.0)
ACT	437	(±17.3)	530	(±21.2)
NT	335	(±43.5)	447	(±30.3)
Aust.	410	(±5.4)	523	(±6.6)

*Confidence intervals (1.96*SE) are reported in brackets.*

The jurisdictional averages for Year 6 ranged from 335 in the Northern Territory to 437 in the ACT. The averages for Year 10 ranged from 447 in the Northern Territory to 539 in Western Australia. As can be seen from the size of the confidence intervals, the precision for smaller jurisdictions was less than for larger jurisdictions. It is important to take these differences in precision into account when interpreting the results from this assessment and comparing test performance across jurisdictions.

Table 3.9 shows pair-wise comparisons between jurisdictional average scale scores for Year 6. The results show that Year 6 students in the ACT and in Victoria had significantly higher average scores than all other jurisdictions. The average score recorded for the Northern Territory was significantly lower than in all other jurisdictions. Students in the remaining jurisdictions (Western Australia, South Australia, New South Wales, Queensland and Tasmania) performed equally well.

Table 3.9 Pair-wise comparisons of Year 6 students' NAP–ICT Literacy average scale scores between the states and territories in 2017

State/territory	Mean scale score		ACT	Vic.	WA	SA	NSW	Qld	Tas.	NT
ACT	437	(±17.3)		·	▲	▲	▲	▲	▲	▲
Vic.	432	(±9.4)	·		▲	▲	▲	▲	▲	▲
WA	406	(±10.3)	▼	▼		·	·	·	·	▲
SA	405	(±14.9)	▼	▼	·		·	·	·	▲
NSW	404	(±11.9)	▼	▼	·	·		·	·	▲
Qld	399	(±12.4)	▼	▼	·	·	·		·	▲
Tas.	390	(±12.9)	▼	▼	·	·	·	·		▲
NT	335	(±43.5)	▼	▼	▼	▼	▼	▼	▼	

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *Mean scale score significantly higher than in comparison state/territory*
▼ *Mean scale score significantly lower than in comparison state/territory*

At Year 10, the average achievement of students in Western Australia, New South Wales, the ACT, Victoria and South Australia were not significantly different from one another (see Table 3.10). The average achievement of students in each of these jurisdictions was significantly higher than that of students in Queensland, Tasmania and the Northern Territory. Students in Queensland performed significantly higher than those in Tasmania, and in turn students in Tasmania performed significantly higher than those in the Northern Territory.

Table 3.10 Pair-wise comparisons of Year 10 students' NAP–ICT Literacy average scale scores between the states and territories in 2017

State/ territory	Mean scale score		WA	NSW	ACT	Vic.	SA	Qld	Tas.	NT
WA	539	(±10.4)		·	·	·	·	▲	▲	▲
NSW	531	(±16.4)	·		·	·	·	▲	▲	▲
ACT	530	(±21.2)	·	·		·	·	▲	▲	▲
Vic.	530	(±10.6)	·	·	·		·	▲	▲	▲
SA	524	(±11.0)	·	·	·	·		▲	▲	▲
Qld	505	(±13.1)	▼	▼	▼	▼	▼		▲	▲
Tas.	480	(±13.0)	▼	▼	▼	▼	▼	▼		▲
NT	447	(±30.3)	▼	▼	▼	▼	▼	▼	▼	

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *Mean scale score significantly higher than in comparison state/territory*
▼ *Mean scale score significantly lower than in comparison state/territory*

Student achievement among the states and territories since 2005

Student achievement among the states and territories since 2005 is reported for each of Year 6 and Year 10 using both the percentage of students attaining the proficient standard and the average NAP–ICT Literacy scale scores. These are shown in Table 3.11 to Table 3.15 including indications of whether data from each previous cycle are significantly different from those collected in 2017. In most but not all cases, when a difference in the percentage of students attaining the proficient standard is significantly different between a previous NAP–ICT Literacy cycle and 2017, the corresponding difference in average achievement is also significant. Any apparent inconsistencies in reported significance are a result of the differences in the two measures of achievement.

At Year 6, variations in achievement within each state and territory across the NAP–ICT Literacy cycles are very similar to the national trend (Table 3.11 and Table 3.12). Overall, nationally and within jurisdictions there has been little variation in student achievement across the five cycles.

Table 3.11 Percentages of Year 6 students attaining the proficient standard nationally and by state and territory since 2005

State/ territory	2017		2014		2011		2008		2005	
NSW	51	(±4.2)	55	(±4.9)	▲ 66	(±4.1)	55	(±5.7)	51	(±6.6)
Vic.	62	(±4.5)	64	(±4.5)	64	(±3.8)	66	(±6.5)	58	(±6.3)
Qld	47	(±5.8)	48	(±5.8)	55	(±4.8)	48	(±5.3)	38	(±5.3)
WA	54	(±4.5)	52	(±4.8)	59	(±5.5)	51	(±4.1)	▼ 40	(±5.4)
SA	53	(±6.5)	59	(±4.3)	62	(±4.9)	▲ 64	(±5.3)	52	(±5.0)
Tas.	49	(±5.9)	46	(±5.4)	51	(±5.5)	52	(±7.0)	49	(±9.0)
ACT	65	(±8.4)	58	(±10.6)	74	(±8.3)	75	(±6.6)	58	(±12.5)
NT	35	(±11.5)	43	(±6.3)	42	(±9.2)	42	(±10.6)	36	(±10.0)
Aust.	53	(±2.4)	55	(±2.5)	▲ 62	(±2.0)	57	(±2.8)	49	(±3.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.12 NAP–ICT Literacy average scale scores nationally and by state and territory for Year 6 since 2005

State/ territory	2017		2014		2011		2008		2005	
NSW	404	(±11.9)	412	(±12.0)	▲ 445	(±12.5)	413	(±14.5)	405	(±12.9)
Vic.	432	(±9.4)	437	(±9.6)	448	(±9.3)	447	(±15.1)	424	(±13.7)
Qld	399	(±12.4)	393	(±13.7)	415	(±14.0)	392	(±11.8)	▼ 370	(±12.3)
WA	406	(±10.3)	404	(±13.2)	424	(±13.5)	403	(±11.5)	▼ 379	(±10.8)
SA	405	(±14.9)	421	(±10.3)	▲ 436	(±10.3)	▲ 439	(±12.5)	412	(±11.4)
Tas.	390	(±12.9)	385	(±15.1)	405	(±12.4)	408	(±16.4)	404	(±19.4)
ACT	437	(±17.3)	429	(±26.0)	466	(±22.8)	▲ 472	(±13.9)	428	(±22.1)
NT	335	(±43.5)	361	(±20.5)	367	(±37.5)	364	(±49.8)	346	(±53.7)
Aust.	410	(±5.4)	413	(±5.7)	▲ 435	(±5.7)	419	(±6.9)	400	(±6.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.13 and Table 3.14 report Year 10 students' attainment of the proficient standard and average achievement since 2005. At the national level, student achievement was significantly higher in 2008 and 2011 than in 2017. This general trend is reflected in student achievement within the majority of states and territories.

Table 3.13 Percentages of Year 10 students attaining the proficient standard nationally and by state and territory since 2005

State/ territory	2017		2014		2011		2008		2005	
NSW	57	(±6.8)	50	(±5.5)	66	(±5.3)	67	(±5.4)	61	(±7.6)
Vic.	55	(±5.0)	55	(±5.9)	▲ 68	(±4.9)	▲ 70	(±6.7)	▲ 67	(±4.8)
Qld	47	(±6.6)	47	(±5.6)	▲ 63	(±4.3)	▲ 62	(±6.2)	60	(±7.4)
WA	62	(±4.0)	57	(±5.8)	61	(±4.0)	65	(±5.9)	56	(±6.1)
SA	56	(±4.6)	57	(±5.9)	63	(±5.6)	▲ 65	(±4.9)	61	(±5.4)
Tas.	39	(±5.6)	▲ 51	(±5.8)	▲ 54	(±7.1)	▲ 58	(±7.4)	▲ 56	(±6.4)
ACT	54	(±8.4)	60	(±9.1)	▲ 72	(±7.0)	▲ 77	(±6.1)	66	(±11.4)
NT	27	(±8.4)	▲ 43	(±9.1)	▲ 48	(±8.8)	▲ 46	(±13.4)	▲ 49	(±13.2)
Aust.	54	(±3.0)	52	(±2.5)	▲ 65	(±2.3)	▲ 66	(±3.0)	61	(±3.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.14 NAP–ICT Literacy average scale scores nationally and by state and territory for Year 10 since 2005

State/ territory	2017		2014		2011		2008		2005	
NSW	531	(±16.4)	512	(±13.7)	▲ 565	(±12.8)	▲ 564	(±13.7)	551	(±13.1)
Vic.	530	(±10.6)	532	(±14.3)	▲ 568	(±12.5)	▲ 569	(±18.1)	▲ 565	(±9.8)
Qld	505	(±13.1)	504	(±16.8)	▲ 553	(±9.5)	▲ 549	(±14.0)	▲ 547	(±11.6)
WA	539	(±10.4)	539	(±11.8)	548	(±10.8)	559	(±12.1)	535	(±11.8)
SA	524	(±11.0)	532	(±15.8)	▲ 552	(±14.8)	▲ 560	(±11.5)	547	(±11.0)
Tas.	480	(±13.0)	▲ 514	(±15.6)	▲ 534	(±15.5)	▲ 539	(±16.3)	▲ 538	(±11.8)
ACT	530	(±21.2)	536	(±26.2)	▲ 582	(±16.1)	▲ 598	(±14.5)	▲ 572	(±17.8)
NT	447	(±30.3)	▲ 501	(±19.9)	490	(±49.5)	466	(±71.5)	▲ 515	(±28.2)
Aust.	523	(±6.6)	520	(±6.7)	▲ 559	(±5.7)	▲ 560	(±7.1)	▲ 551	(±5.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Student achievement and background characteristics

Student background characteristics were originally collected as part of the student survey. In 2011, this information was directly collected from the schools, which resulted in much higher levels of missing data. In the last two cycles, background data was again collected from the schools, but the amount of missing data has been substantially reduced.

Given the change in source (from students to schools) and the changes in the amount of missing data across earlier cycles, comparisons in performance can only be made between 2014 and 2017. The exception to this is gender, for which complete data is available from all five cycles, and it is unlikely to show much variation caused by change in source.

In addition, a new classification system was introduced for geographic location for use in all NAP studies. Consequently, comparisons with previous cycles by geographic location are not included in this report.

Differences in achievement by gender since 2005

Table 3.15 and Table 3.16 show the achievement of male and female students in Year 6 and Year 10 at the national level with results from previous assessment cycles. These tables show that female students significantly outperformed male students in 2017 and across all previous cycles.

Table 3.15 Percentages of students attaining the proficient standard by gender since 2005

	Gender	2017	2014	2011	2008	2005
Year 6	Males	51 (±2.8)	51 (±3.3)	▲ 58 (±2.7)	52 (±3.0)	45 (±4.9)
	Females	56 (±3.5)	60 (±2.9)	▲ 66 (±2.5)	62 (±3.6)	52 (±4.1)
Year 10	Males	51 (±3.6)	47 (±3.4)	▲ 62 (±2.7)	▲ 63 (±3.9)	60 (±4.2)
	Females	58 (±4.1)	58 (±3.3)	▲ 67 (±3.3)	▲ 70 (±3.2)	63 (±3.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

While the average scale scores of female students were significantly higher than those of male students at both year levels, this difference was small in 2017 (14 score points for Year 6; 19 score points for Year 10).

Table 3.16 NAP–ICT Literacy average scale scores by gender since 2005

	Gender	2017	2014	2011	2008	2005
Year 6	Males	403 (±7.0)	402 (±7.2)	▲ 425 (±7.2)	410 (±7.3)	393 (±9.2)
	Females	417 (±6.7)	424 (±6.4)	▲ 446 (±6.7)	429 (±9.0)	407 (±6.5)
	Difference (M – F)	**-14** (±8.4)	**-23** (±7.6)	**-22** (±7.7)	**-19** (±8.9)	**-15** (±11.3)
Year 10	Males	514 (±8.4)	506 (±9.0)	▲ 553 (±7.3)	▲ 554 (±9.1)	▲ 546 (±7.6)
	Females	533 (±8.8)	535 (±7.4)	▲ 566 (±7.5)	▲ 570 (±7.1)	555 (±6.9)
	Difference (M – F)	**-19** (±11.3)	**-29** (±10.3)	**-14** (±9.3)	**-16** (±9.8)	-9 (±10.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

*Statistically significant differences are in **bold**.*

When compared with previous assessment cycles, the difference in achievement of female students and male students has remained equivalent.

Differences in achievement by Indigenous status since 2014

Table 3.17 and Table 3.18 display achievement of non-Indigenous and Indigenous students at both year levels in 2017 and 2014. There were considerable differences in achievement between non-Indigenous and Indigenous students at both year levels, evidenced by both the percentage of students achieving the proficient standard and by the average NAP–ICT Literacy scale scores. At both year levels, the difference between the percentages of non-Indigenous students and Indigenous students attaining the proficient standard was more than 30 percentage points in both assessment cycles. The significant difference in average achievement was about 100 scale score points for both year levels, which is large (approximately one standard deviation).

Table 3.17 Percentages of students attaining the proficient standard by Indigenous status since 2014

	Indigenous status	2017	2014
Year 6	Non-Indigenous students	55 (±2.4)	57 (±2.5)
	Indigenous students	24 (±7.0)	22 (±8.1)
Year 10	Non-Indigenous students	55 (±3.1)	53 (±2.6)
	Indigenous students	24 (±9.5)	20 (±8.8)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.18 NAP–ICT Literacy average scale scores by Indigenous status since 2014

	Indigenous status	2017		2014	
Year 6	Non-Indigenous students	415	(±4.9)	417	(±5.5)
	Indigenous students	311	(±30.4)	318	(±19.8)
	Difference (Non-Indigenous – Indigenous)	**103**	(±30.3)	**99**	(±20.3)
Year 10	Non-Indigenousstudents	526	(±6.9)	522	(±6.6)
	Indigenousstudents	424	(±29.3)	428	(±26.5)
	Difference (Non-Indigenous – Indigenous)	**101**	(±30.2)	**94**	(±25.4)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

*Statistically significant differences are in **bold**.*

Differences in achievement by language spoken at home since 2014

Table 3.19 and Table 3.20 show the NAP–ICT Literacy achievement of students who speak only English at home and those who speak another language at home in 2017 and 2014. While no significant differences in performance between the two language groups were recorded in 2014, Year 6 students who speak a language other than English at home significantly outperformed students who speak only English at home. The difference in average achievement scores was small. The difference in the proportion of students attaining the proficient standard was 5 percentage points.

Table 3.19 Percentages of students attaining the proficient standard by language spoken at home since 2014

	Language spoken at home	2017		2014	
Year 6	English	52	(±2.6)	55	(±2.7)
	Language other than English	58	(±5.1)	58	(±5.5)
Year 10	English	55	(±3.1)	52	(±2.7)
	Language other than English	51	(±6.0)	51	(±6.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.20 NAP–ICT Literacy average scale scores by language spoken at home since 2014

	Language spoken at home	2017	2014
Year 6	English	407 (±6.3)	412 (±6.2)
	Language other than English	420 (±10.1)	417 (±15.2)
	Difference (English – Other)	**-13** (±11.6)	-5 (±16.5)
Year 10	English	526 (±5.9)	520 (±7.2)
	Language other than English	516 (±15.6)	520 (±16.9)
	Difference (English – Other)	11 (±15.3)	0 (±18.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

*Statistically significant differences are in **bold**.*

Differences in achievement by country of birth since 2014

Achievement in the NAP–ICT Literacy assessment for students born in Australia and those born overseas is shown in Table 3.21 and Table 3.22. In 2014, no significant differences were recorded between the two groups of students. In 2017, however, Year 10 students who were born in Australia received significantly higher achievement scores than students who were born in other countries. The difference was small in average achievement and 7 percentage points in attaining the proficient standard.

Table 3.21 Percentages of students attaining the proficient standard by country of birth since 2014

	Country of birth	2017	2014
Year 6	Born in Australia	53 (±2.4)	55 (±2.6)
	Born overseas	55 (±7.6)	60 (±6.6)
Year 10	Born in Australia	55 (±3.0)	53 (±2.6)
	Born overseas	48 (±5.4)	48 (±5.2)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.22 NAP–ICT Literacy average scale scores by country of birth at home since 2014

	Country of birth	2017	2014
Year 6	Born in Australia	409 (±6.0)	412 (±5.9)
	Born overseas	414 (±12.2)	420 (±15.0)
	Difference (Australia – Overseas)	-5 (±13.4)	-8 (±15.4)
Year 10	Born in Australia	527 (±5.8)	521 (±6.7)
	Born overseas	506 (±16.1)	513 (±13.1)
	Difference (Australia – Overseas)	**21** (±14.7)	8 (±12.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

*Statistically significant differences are in **bold**.*

Differences in achievement by geographic location in 2017

Table 3.23 and Table 3.24 show achievement by students according to geographic location of the school. The results show that for Year 6, students at metropolitan schools have significantly higher average test scores than those enrolled at regional schools (41 scale score points between averages and 15 points in percentage attaining the proficient standard). Students at regional schools, in turn, had significantly higher average test scores than those from remote schools (45 scale score points between averages and 8 points in percentage attaining the proficient standard). The differences were moderate in size.

Table 3.23 Percentages of students attaining the proficient standard by geographic location in 2017

	Geographic location	2017
Year 6	Metropolitan	58 (±2.8)
	Regional	43 (±4.0)
	Remote	35 (±21.6)
Year 10	Metropolitan	57 (±3.7)
	Regional	48 (±4.7)
	Remote	31 (±14.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table 3.24 NAP–ICT Literacy average scale scores by geographic location in 2017

	Geographic location	2017	
Year 6	Metropolitan	422	(±5.9)
	Regional	381	(±11.4)
	Remote	336	(±34.4)
	Difference (Met – Reg)	**41**	(±13.0)
	Difference (Reg – Rem)	**45**	(±36.1)
Year 10	Metropolitan	531	(±8.6)
	Regional	507	(±9.7)
	Remote	464	(±44.2)
	Difference (Met – Reg)	**24**	(±13.0)
	Difference (Reg – Rem)	43	(±45.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

For Year 10, only the difference between metropolitan and regional schools was significant. The difference was small (24 scale score points between averages and 9 points in percentage attaining the proficient standard).

Differences in achievement by parental occupation since 2014

Student achievement in the NAP–ICT Literacy assessment was significantly higher for students with parents in higher occupation groups. Across both year levels, about two-thirds of the students with a parent who was a senior manager or professional (the highest occupation group) performed at or above the proficient standard, compared to fewer than half of students whose parents were unskilled labourers, and office, sales and service staff. One-third of students with parents not in paid work performed at or above the proficient standard.

Table 3.25 Percentages of students attaining the proficient standard by parental occupation since 2014

	Highest parental occupation	2017		2014	
Year 6	Senior managers and professionals	68	(±3.3)	72	(±4.0)
	Other managers and associate professionals	61	(±3.9)	63	(±5.0)
	Tradespeople and skilled office, sales and service staff	48	(±5.3)	52	(±4.2)
	Unskilled labourers, and office, sales and service staff	38	(±5.1)	42	(±4.9)
	Not in paid work in last 12 months	33	(±6.5)	30	(±7.4)
Year 10	Senior managers and professionals	69	(±3.8)	65	(±4.5)
	Other managers and associate professionals	61	(±4.3)	56	(±4.1)
	Tradespeople and skilled office, sales and service staff	46	(±5.4)	50	(±5.5)
	Unskilled labourers, and office, sales and service staff	43	(±6.0)	40	(±6.0)
	Not in paid work in last 12 months	29	(±7.3)	29	(±6.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.26 NAP–ICT Literacy average scale scores by parental occupation since 2014

	Highest parental occupation	2017	2014
Year 6	Senior managers and professionals	449 (±7.5)	456 (±7.6)
	Other managers and associate professionals	425 (±7.1)	431 (±8.3)
	Tradespeople and skilled office, sales and service staff	396 (±9.4)	408 (±8.7)
	Unskilled labourers, and office, sales and service staff	371 (±12.8)	377 (±11.9)
	Not in paid work in last 12 months	353 (±19.4)	343 (±16.4)
Year 10	Senior managers and professionals	561 (±8.9)	555 (±9.4)
	Other managers and associate professionals	540 (±8.2)	532 (±9.0)
	Tradespeople and skilled office, sales and service staff	507 (±8.4)	515 (±10.5)
	Unskilled labourers, and office, sales and service staff	496 (±11.9)	485 (±15.3)
	Not in paid work in last 12 months	458 (±21.2)	451 (±17.9)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

The differences were significant and large in average scales scores as well. Year 6 students with parents who were senior managers or professionals had NAP–ICT Literacy scale scores that were 78 score points higher than those with parents in the category for unskilled labourers, and office, sales or service staff. Among Year 10 students, the difference between students in these two groups was 65 score points.

There were no significant differences recorded for the average scale scores by parental occupation group across the assessment cycles from 2014 to 2017.

Differences in achievement by parental education since 2014

Student achievement on the NAP–ICT Literacy assessment was higher for students whose parents had higher levels of education. About two-thirds of the students with a parent who had a bachelor degree or above performed at or above the proficient standard, compared to a quarter of students whose parents completed Year 10 or Year 9 as their highest level of education.

Table 3.27 Percentages of students attaining the proficient standard by parental education since 2014

	Highest parental education	2017	2014
Year 6	Bachelor degree or above	68 (±3.1)	73 (±3.7)
	Advanced diploma/Diploma	55 (±4.4)	56 (±5.3)
	Certificates I–IV (including trade certificates)	44 (±3.9)	47 (±4.1)
	Year 12 or equivalent	46 (±5.7)	44 (±6.1)
	Year 11 or equivalent	36 (±10.5)	40 (±9.3)
	Year 10 or equivalent	23 (±7.8)	30 (±7.2)
	Year 9 or equivalent or below	22 (±10.9)	39 (±14.1)
Year 10	Bachelor degree or above	70 (±3.2)	69 (±4.3)
	Advanced diploma/Diploma	52 (±5.4)	51 (±5.3)
	Certificates I–IV (including trade certificates)	44 (±4.8)	45 (±4.3)
	Year 12 or equivalent	47 (±7.7)	48 (±7.8)
	Year 11 or equivalent	42 (±10.1)	39 (±8.1)
	Year 10 or equivalent	22 (±7.6)	32 (±7.7)
	Year 9 or equivalent or below	26 (±12.1)	32 (±12.2)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

Table 3.28 NAP–ICT Literacy average scale scores by parental education since 2014

	Highest parental education	2017	2014
Year 6	Bachelor degree or above	449 (±6.9)	457 (±6.8)
	Advanced diploma/Diploma	411 (±9.6)	416 (±9.4)
	Certificates I–IV (including trade certificates)	387 (±8.4)	394 (±8.6)
	Year 12 or equivalent	392 (±13.6)	387 (±11.6)
	Year 11 or equivalent	358 (±26.3)	373 (±21.0)
	Year 10 or equivalent	322 (±24.6)	347 (±16.9)
	Year 9 or equivalent or below	320 (±26.6)	357 (±38.6)
Year 10	Bachelor degree or above	562 (±7.4)	561 (±9.6)
	Advanced diploma/Diploma	520 (±10.3)	520 (±10.9)
	Certificates I–IV (including trade certificates)	499 (±8.6)	503 (±10.4)
	Year 12 or equivalent	515 (±11.7)	503 (±17.4)
	Year 11 or equivalent	498 (±21.6)	486 (±19.5)
	Year 10 or equivalent	443 (±19.4)	465 (±23.8)
	Year 9 or equivalent or below	430 (±41.5)	468 (±28.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than 2017*
▼ *if significantly lower than 2017*

The differences were significant and large in average scales scores as well. Students who had a parent with a bachelor degree or above achieved, on average, more than 100 scale score points (almost one achievement level) higher than students whose parent completed Year 10 or Year 9 as their highest level of education.

There were no statistically significant differences recorded for the average scale scores by parental occupation across the assessment cycles from 2014 to 2017.

4

Student use of digital devices

Chapter highlights

- The majority of students were familiar with digital devices and were highly experienced in their use, particularly by Year 10.
- Higher levels of digital device experience were associated with higher levels of ICT literacy, particularly in Year 10.
- Students tended to agree that digital devices helped them in a variety of ways when they were doing their work.
- Digital device self-efficacy was significantly higher in Year 10 than Year 6, and significantly higher for males than females.
- Higher levels of self-efficacy were significantly associated with higher levels of ICT literacy for female and male students.
- Students' ratings of the importance of using digital devices were significantly higher in Year 10 than Year 6, and higher for males than females.
- Higher ratings of the importance of using digital devices were significantly associated with higher levels of ICT literacy, particularly for Year 10 students, and particularly for male students.

Introduction

In addition to the assessment instrument, NAP–ICT Literacy 2017 included a survey asking about students' use of digital devices at school and outside of school, their experience of using digital devices and their access to ICT resources. This computer-based survey was administered following the NAP–ICT Literacy assessment. Results from the survey provide information about familiarity with, access to and use of ICT by students in Australia.

In previous cycles, the NAP–ICT Literacy survey asked about students' computer use. Due to the changing nature of technology, in particular the types of devices now available

to students and teachers for ICT-related tasks and activities, the 2017 NAP–ICT Literacy survey updated its definition of the devices considered to include more than just computers.

Students were asked about their use of, experience with, and access to digital devices, which included computers (desktop or portable), tablets (with on-screen or external keyboards) and smartphones (for accessing the internet or using apps). Given this broader definition of digital devices compared to previous cycles, the pattern of student responses to these questions could be expected to change in 2017 compared to previous cycles of NAP–ICT Literacy. For this reason, comparisons between 2017 data and that of previous years have been kept to a minimum. Where comparisons have been drawn to previous cycles, any differences to the wording of survey questions have been noted.

Access to and use of digital devices

Experience of using ICT

Students were first asked how long they had been using: a) computers (desktop or portable) and b) tablets. Response options ranged from (1) never or less than one year to (5) seven years or more (see Table 4.1). A similar question was asked in previous cycles, but students were simply asked how long they had been using computers. A single measure of students' experience using 'digital devices' in 2017 was computed by taking the larger of the two responses given to a) and b).

Table 4.1 Distributions of students' years of experience of using digital devices shown as percentages for each category

Years of experience	Year 6				Year 10			
	Computers (desktop or portable)		Tablets		Computers (desktop or portable)		Tablets	
Never or less than one year	8	(±1.1)	13	(±1.3)	4	(±0.8)	12	(±1.1)
At least one year but less than three years	17	(±1.4)	18	(±1.3)	8	(±1.0)	14	(±1.3)
At least three years but less than five years	22	(±1.4)	27	(±1.6)	14	(±1.2)	30	(±1.7)
At least five years but less than seven years	26	(±1.6)	23	(±1.3)	24	(±1.6)	30	(±1.4)
Seven years or more	26	(±1.8)	19	(±1.3)	51	(±1.7)	14	(±1.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

Table 4.1 shows the length of time for which students in Year 6 and Year 10 reported using both computers (desktop or portable) and tablets. While the majority of students had at least three years' experience using both computers and tablets, students had more experience with computers. Seventy-four per cent of Year 6 students and 89 per cent of Year 10 students had at least three years' experience using computers, and 69 per cent of Year 6 students and 73 per cent of Year 10 students had at least three years' experience using tablets.

These data illustrate that almost all students assessed in 2017 were familiar with digital devices and were experienced in using them. The extent of students' familiarity with digital devices is described in Table 4.2.

Table 4.2 Percentages of students with at least five years' experience using digital devices across all cycles of NAP–ICT Literacy since 2005

Cycle	Year 6		Year 10	
2017*	64	(±1.7)	79	(±1.5)
2017	52	(±1.9)	74	(±1.7)
2014	64	(±1.9)	84	(±1.3)
2011	62	(±1.6)	76	(±1.5)
2008	56	(±2.3)	70	(±2.0)
2005	54	(±2.7)	64	(±2.3)

** This question asked about use of "digital devices", all the others questions about "computers."*

In 2017 and 2014, five years of experience was included, while in previous cycles only students with more than five years of experience were counted.

*Confidence intervals (1.96*SE) are reported in brackets.*

Results in Table 4.2 show the percentages of students with more than five years' experience using digital devices or computers, across all cycles of NAP–ICT Literacy since 2005. Note that two sets of values have been reported for 2017. The top row in the table reports the percentages of students in 2017 with more than five years' experience using digital devices (computers or tablets). The remaining rows show the percentages of students with more than five years' experience using computers (desktop or portable), which supports comparison to data collected in previous cycles.

The differences in the percentages of students having reported at least five years' experience using digital devices and computers are attributable to those students who reported at least five years' experience using tablets or smartphones (for accessing the internet or using apps) but not computers. Note that in 2014, these students would most likely have indicated they had at least five years' experience using computers (as there was no option relating to other digital devices).

Percentages of students with at least five years' experience using computers increased steadily between 2005 and 2011. Changes between 2011 and 2017 (comparing computers in 2011 and 2014 with digital devices in 2017) were minimal. Despite changes

in the definitions of the categories between 2011 and 2014 (see explanatory note below Table 4.2), and the changes to the wording of the question in 2017 to include more digital devices than just computers, it appears that while the percentage of experienced users of computers (or digital devices) grew in the first few cycles of this program, it has generally plateaued since 2011.

Differences in experience with computers by state or territory and socio-economic group (based on parental occupation) are shown in Table 4.3. The same single measure of students' experience using digital devices that was used in the previous table (at least five years' experience) has also been used here for reporting results. The top section of the table shows that the majority of students in all states and territories had at least five years' experience using digital devices. Percentages ranged from 55 per cent (Northern Territory) to 66 per cent (NSW and Victoria) for Year 6 students, and from 72 per cent (Northern Territory) to 83 per cent (Tasmania) for Year 10 students.

Table 4.3 Percentages of students with at least five years' experience using digital devices by state or territory and parental occupation

State/territory	Year 6		Year 10	
NSW	66	(±2.8)	78	(±3.8)
Vic.	66	(±4.2)	82	(±2.3)
Qld	60	(±4.1)	77	(±2.9)
WA	61	(±4.4)	78	(±3.7)
SA	65	(±4.4)	80	(±3.3)
Tas.	64	(±3.9)	83	(±4.3)
ACT	56	(±4.9)	81	(±5.4)
NT	55	(±5.2)	72	(±8.4)
Highest parental occupation	**Year 6**		**Year 10**	
Senior managers and professionals	66	(±3.3)	83	(±2.5)
Other managers and associate professionals	65	(±3.0)	80	(±2.7)
Tradespeople and skilled office, sales and service staff	65	(±3.1)	78	(±3.1)
Unskilled labourers, and office, sales and service staff	59	(±5.3)	77	(±4.4)
Not in paid work in last 12 months	62	(±5.1)	71	(±6.9)

*Confidence intervals (1.96*SE) are reported in brackets.*

The bottom section of Table 4.3 shows that percentages of students with at least five years' experience using digital devices generally increased as the students' parents' occupations were associated with higher levels of responsibility and education. However, across both year levels, the ranges between the highest and lowest percentages of students are quite small (7 per cent at Year 6 and 12 per cent at Year 10).

While these analyses provide some demographic information about the students with more (and less) experience using computers or digital devices, they do not provide any information about the relationship between students' years of experience using computers and their ICT literacy. Table 4.4 shows the NAP–ICT Literacy scale scores for students with at least five years' experience and less than five years' experience using digital devices.

Table 4.4 Average NAP–ICT Literacy scale scores for students with at least five years' and less than five years' experience using digital devices

Years of experience	Year 6		Year 10	
At least five years' experience	425	(±5.6)	539	(±5.4)
Less than five years' experience	387	(±7.8)	472	(±13.2)
Difference (five minus less)	**39**	(±8.1)	**67**	(±12.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Students with at least five years' experience using digital devices performed significantly better than students with less experience across both year levels. The difference for Year 10 students (67 points) was almost twice the difference for Year 6 students (39 points).

Device use by location

Students were asked what type of digital devices they used: a) at school and b) outside of school. The results are summarised in Table 4.5. At school, the most widely used device was the desktop or portable computer (more than 80 per cent in both year levels). These percentages were lower outside of school (56 per cent for Year 6 and 75 per cent for Year 10). For all other devices, percentages were higher for use outside of school compared with use at school.

Table 4.5 Percentages of use of device at school and outside of school

Type of digital device	Year 6				Year 10			
	At school		Outside of school		At school		Outside of school	
Computer (desktop or portable)	81	(±2.7)	56	(±1.8)	86	(±2.0)	75	(±1.6)
Tablet with on-screen keyboard	36	(±3.5)	54	(±1.7)	17	(±2.4)	43	(±1.8)
Tablet with external keyboard	10	(±1.5)	16	(±1.4)	10	(±1.5)	14	(±1.4)
Smartphone (to access the internet or use apps)	5	(±0.7)	62	(±2.0)	44	(±2.4)	87	(±1.3)
None	3	(±0.6)	3	(±0.5)	2	(±0.7)	1	(±0.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

Smartphones showed the highest percentage of use outside of school for both year levels. In addition, Year 10 students appeared to have greater access to smartphones at school than Year 6 students. While 62 per cent of Year 6 students reported using smartphones outside of school, only 5 per cent reported using them at school. On the other hand, 87 per cent of Year 10 students reported using smartphones outside of school, and 44 per cent also reported using them at school.

Table 4.6 shows average achievement by type of digital device used at school and outside of school. For Year 6, students with access to either a computer (desktop or laptop) or a tablet performed significantly less well than students with access to both types of devices. The significant difference was moderate in size at school and large outside of school. The significant difference between access to both types of device and no access to either of those devices was large (almost one achievement level or four years of education).

Table 4.6 Average NAP–ICT Literacy scores by type of digital device at school and outside of school

	Type of digital device	At school	Outside of school
Year 6	Computer and tablet	449 (±7.6)	462 (±5.6)
	Only computer	▼ 406 (±6.4)	▼ 402 (±8.1)
	Only tablet	▼ 400 (±13.8)	▼ 401 (±8.6)
	Neither	▼ 334 (±19.5)	▼ 369 (±8.3)
Year 10	Computer and tablet	540 (±9.1)	555 (±5.7)
	Only computer	531 (±6.7)	▼ 538 (±7.4)
	Only tablet	▼ 501 (±21.4)	▼ 499 (±16.3)
	Neither	▼ 466 (±24.2)	▼ 457 (±9.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

▲ *if significantly higher than using both computers and tablets*
▼ *if significantly lower than using both computers and tablets*

For Year 10, access to both types of devices was not associated with higher average performance than access to only a computer. Outside of school, the significant difference was small. Compared to access to a tablet only, however, having access to both types of digital devices was significantly associated with higher performance. The difference was moderate at school and large outside of school. As with the results for Year 6 students, for Year 10 students the significant difference between access to both types of device and no access to either of those devices was large (almost one achievement level or three to four years of education).

Access to own portable digital devices for use in class

As a new question in 2017, students were asked to report both whether or not they brought a portable digital device to school for use in class and, if they did, whether it was provided by the school or their own families. Portable digital devices could be either a portable computer or tablet device.

Table 4.7 Percentages of students with access to their own portable digital devices for use in class

Access to their own portable digital device		Year 6		Year 10	
Notebook computer or netbook	My school provides me with device.	41	(±3.2)	29	(±3.8)
	The school tells me what brand of model or device I may bring.	4	(±1.6)	11	(±2.1)
	I can bring any brand or model of device to school.	5	(±1.4)	30	(±4.0)
Tablet	My school provides me with device.	26	(±3.1)	8	(±2.0)
	The school tells me what brand of model or device I may bring.	9	(±2.4)	8	(±2.2)
	I can bring any brand or model of device to school.	9	(±1.9)	11	(±1.6)
	No access to a personal portable device.	31	(±3.1)	23	(±2.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

Categories do not add up to 100 per cent.

About one-third of Year 6 students and a quarter of Year 10 students did not have access to their own portable device at school. At least some of these students probably had access to shared desktops or portable devices. Twenty-eight per cent of Year 6 students brought their own device to school compared to 60 per cent of Year 10 students.

Frequency of using digital devices

Students were then asked how often they used computers and tablet devices in the following places:

- a desktop, laptop, netbook (computer) – at school
- a desktop, laptop, netbook (computer) – outside of school
- tablet – at school
- tablet – outside of school

Response options ranged from: (1) several times a day to (5) once a week or less. Students were recorded as using a digital device if they indicated they used either a computer (desktop, laptop or netbook) or a tablet.

Across Australia, on average, just over one-third of the Year 6 and just over half of the Year 10 students reported using a digital device at least once a day at school (see Table 4.8).

The percentages for students in Year 6 ranged from 33 per cent in the Northern Territory to 48 per cent in the ACT. In Year 10, the percentages ranged from 48 per cent in New South Wales to 77 per cent in South Australia. The percentages were somewhat higher for the use of digital devices outside of school, especially for Year 6 students. Within each year level, the percentages were fairly consistent across states and territories.

Table 4.8 Percentages of students using digital devices once a day or more at school and outside of school nationally and by state and territory

State/territory	Year 6		Year 10	
	At school	Outside of school	At school	Outside of school
NSW	39 (±5.3)	60 (±3.7)	48 (±5.8)	63 (±3.7)
Vic.	38 (±6.1)	58 (±4.9)	71 (±5.7)	65 (±4.4)
Qld	33 (±4.4)	54 (±3.3)	57 (±5.7)	67 (±3.0)
WA	30 (±6.0)	54 (±3.9)	51 (±5.6)	66 (±3.8)
SA	40 (±5.9)	52 (±3.0)	77 (±3.8)	67 (±3.6)
Tas.	39 (±5.7)	56 (±3.6)	49 (±7.5)	55 (±6.7)
ACT	48 (±11.1)	62 (±5.4)	66 (±5.2)	72 (±5.4)
NT	33 (±8.5)	50 (±8.5)	50 (±11.0)	60 (±16.7)
Aust.	37 (±2.6)	57 (±1.9)	58 (±2.7)	65 (±1.8)

*Confidence intervals (1.96*SE) are reported in brackets.*

Having determined how many students in Australia were frequently using these digital devices at school, the following analysis looks at whether these students were more proficient in ICT literacy.

Table 4.9 Average NAP–ICT Literacy scale scores for students who use digital devices at least once a day or less than once a day

Frequency of use	Year 6	Year 10
Once a day or more	413 (±6.4)	535 (±6.7)
Less than once a day	413 (±7.5)	497 (±8.8)
Difference (More – Less)	0 (±9.3)	38 (±9.2)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Year 10 students who reported using digital devices once a day or more achieved significantly higher ICT Literacy scale scores than those who reported using digital devices less than once a day. The difference was moderate. There was no such difference for Year 6 students.

Student attitudes towards digital devices

Digital device self-efficacy

In previous cycles of NAP–ICT Literacy, student's confidence in completing tasks on computer (computer self-efficacy) has been positively associated with students' ICT literacy. In 2017, students were asked how well they could do certain tasks on a digital device (noting that in previous cycles they were asked how well they could complete given tasks on a computer). See Table 4.10 for the complete list of tasks. The 2014 NAP–ICT Literacy results have also been included for comparison with those collected in 2017, as the student responses are still relevant to the description of students' self-efficacy. Due to the change in wording in the question stem, however, any changes over time should be interpreted with caution.

Table 4.10 Category percentages for responses to questions about self-efficacy in using digital devices in 2017, and in comparison with 2014

	How well can you do each of these tasks on a digital device?*	Year	I can do this easily by myself		I can do this with a bit of effort		I know what this means but I cannot do it		I don't know what this means	
Year 6	Edit digital photographs or other graphic images	2017	47	(±1.9)	35	(±1.7)	13	(±1.1)	5	(±0.9)
		2014	45	(±2.0)	36	(±1.8)	16	(±1.4)	4	(±0.6)
	Create a database (e.g. using Microsoft Access, FileMaker)	2017	19	(±1.3)	33	(±1.6)	25	(±1.6)	23	(±1.6)
		2014	21	(±1.7)	25	(±1.4)	30	(±1.4)	24	(±1.6)
	Enter data in a spreadsheet (e.g. using Microsoft Excel)[1]	2017	33	(±1.8)	31	(±1.5)	17	(±1.4)	19	(±1.7)
		2014	-	-	-	-	-	-	-	-
	Use spreadsheet software (e.g. Microsoft Excel) to plot a graph[2]	2017	32	(±1.8)	32	(±1.5)	19	(±1.5)	18	(±1.5)
		2014	32	(±2.0)	31	(±1.5)	20	(±1.5)	17	(±1.4)
	Download music from the Internet	2017	55	(±1.9)	23	(±1.4)	19	(±1.5)	3	(±0.7)
		2014	59	(±1.5)	22	(±1.3)	16	(±1.2)	3	(±0.5)
	Create a multi-media presentation (with sound, pictures, video)	2017	44	(±1.9)	33	(±1.6)	15	(±1.4)	8	(±1.2)
		2014	48	(±2.4)	29	(±1.6)	16	(±1.3)	7	(±0.9)
	Construct a webpage	2017	16	(±1.7)	28	(±1.6)	44	(±2.0)	12	(±1.3)
		2014	18	(±1.8)	25	(±1.4)	46	(±1.9)	11	(±1.0)
	Upload files (images, audio/ video and text) to a website	2017	40	(±1.8)	26	(±1.5)	28	(±1.6)	7	(±1.1)
		2014	41	(±1.9)	26	(±1.4)	27	(±1.8)	7	(±1.0)
	Use social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)[3]	2017	73	(±2.3)	11	(±1.5)	13	(±1.6)	3	(±0.7)
		2014	63	(±1.9)	13	(±1.3)	19	(±1.4)	5	(±0.7)

Table 4.10 (continued)

	How well can you do each of these tasks on a digital device?*	Year	I can do this easily by myself		I can do this with a bit of effort		I know what this means but I cannot do it		I don't know what this means	
Year 10	Edit digital photographs or other graphic images	2017	50	(±1.8)	39	(±1.7)	9	(±1.0)	2	(±0.4)
		2014	50	(±1.7)	38	(±1.6)	10	(±1.0)	1	(±0.5)
	Create a database (e.g. using Microsoft Access, FileMaker)	2017	16	(±1.4)	31	(±1.5)	31	(±1.6)	22	(±1.5)
		2014	16	(±1.3)	27	(±1.6)	35	(±1.6)	21	(±1.4)
	Enter data in a spreadsheet (e.g. using Microsoft Excel)[1]	2017	44	(±2.2)	39	(±1.9)	13	(±1.4)	4	(±0.7)
		2014	-	-	-	-	-	-	-	-
	Use spreadsheet software (e.g. Microsoft Excel) to plot a graph[2]	2017	42	(±2.2)	39	(±1.8)	14	(±1.3)	4	(±0.7)
		2014	40	(±2.4)	40	(±1.9)	15	(±1.2)	5	(±0.9)
	Download music from the Internet	2017	77	(±1.6)	16	(±1.4)	7	(±0.9)	1	(±0.3)
		2014	80	(±1.6)	14	(±1.3)	5	(±0.8)	1	(±0.4)
	Create a multi-media presentation (with sound, pictures, video)	2017	60	(±2.0)	30	(±1.7)	8	(±1.0)	2	(±0.6)
		2014	63	(±2.0)	27	(±1.6)	8	(±1.2)	2	(±0.5)
	Construct a webpage	2017	21	(±1.6)	37	(±1.8)	36	(±1.5)	5	(±0.8)
		2014	18	(±1.4)	35	(±1.8)	42	(±1.9)	6	(±0.8)
	Upload files (images, audio/ video and text) to a website	2017	56	(±2.0)	26	(±1.6)	16	(±1.4)	2	(±0.6)
		2014	65	(±2.0)	22	(±1.5)	11	(±1.2)	2	(±0.5)
	Use social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)[3]	2017	91	(±1.2)	6	(±0.9)	2	(±0.6)	1	(±0.4)
		2014	89	(±1.3)	7	(±0.9)	3	(±0.6)	2	(±0.5)

*Confidence intervals (1.96*SE) are reported in brackets. Because results are rounded to the nearest whole number some totals may appear inconsistent.*

** In 2014 "computer" was used instead of "digital device"*

[1] Question not asked in 2014

[2] Question text in 2014: "Use a spreadsheet to plot a graph"

[3] Question text in 2014: "Use social media"

For the majority of tasks, the distribution of student responses did not change much between 2014 and 2017.

In order to compare self-efficacy for students in using digital devices by different sub-groups of students, a scale was derived based on all items in this question. Item response theory was used to derive weighted likelihood estimates for this index.

Scale scores were transformed into a metric where the national mean score for Year 6 students was 50 with a standard deviation of 10. The scaling analyses and procedures for these items, as well as information about reliabilities, are detailed in the *NAP–ICT Literacy 2017 Technical Report*.

Table 4.11 shows the scale scores for the index of digital device self-efficacy for male and female students in both year levels. Overall, Year 10 students showed significantly higher levels of self-efficacy than Year 6 students. In addition, at both year levels, males showed significantly more self-efficacy than females.

Table 4.11 Average scores on index of digital device self-efficacy for male and female students

Self-efficacy	All students		Males		Females		Difference (M – F)	
Year 6	50.0	(±0.4)	50.9	(±0.5)	49.1	(±0.5)	**1.8**	(±0.7)
Year 10	54.0	(±0.4)	54.8	(±0.6)	53.3	(±0.5)	**1.5**	(±0.8)
Difference (Year 10 – Year 6)	**4.0**	(±0.6)	**3.9**	(±0.8)	**4.2**	(±0.7)	-0.3	(±1.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

In order to explore the associations between students' attitudes towards digital devices, and NAP–ICT Literacy scale scores, two methods of associations are reported. The first presents average survey scale scores for students who are either below the proficient standard or above it. This helps to explain whether students with a greater concept of ICT knowledge have different attitudes towards digital devices in comparison to those with less developed levels of knowledge.

The second method reports the correlation between each attitude of interest and NAP–ICT Literacy scale scores. Pearson's correlation coefficients can assume values between –1 and +1. A positive correlation between the NAP–ICT Literacy scale and an attitudinal measure scale would mean that an increase in student achievement corresponds to an increase in the attitudinal scale score, while a negative correlation indicates an association in which an increase in one measure corresponds to a decrease in the other measure.

Students above the proficient standard had significantly higher levels of self-efficacy than students below (see Table 4.12). This difference was moderate in size for both year levels and both gender groups.

Table 4.12 Average scores on index of digital device self-efficacy for students above and below the proficient standard overall and by gender

	Proficient standard	All students		Males		Females	
Year 6	Above	51.8	(±0.5)	52.8	(±0.7)	50.8	(±0.6)
	Below	47.7	(±0.7)	48.6	(±0.8)	46.7	(±0.9)
	Difference	**4.1**	(±0.9)	**4.2**	(±1.1)	**4.1**	(±1.2)
	Correlation	**0.25**	(±0.04)	**0.26**	(±0.04)	**0.24**	(±0.06)
Year 10	Above	55.9	(±0.5)	57.1	(±0.6)	54.7	(±0.7)
	Below	51.8	(±0.6)	52.2	(±0.8)	51.2	(±0.9)
	Difference	**4.1**	(±0.7)	**4.9**	(±1.0)	**3.4**	(±1.1)
	Correlation	**0.26**	(±0.04)	**0.29**	(±0.05)	**0.24**	(±0.06)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

The correlation between self-efficacy and achievement was significant but small (around 0.25). This relationship was the same for Year 6 and Year 10 students overall, and for Year 6 male and Year 6 female students.

Importance of digital devices

Students were asked how much they agreed with certain statements about the importance of using digital devices (see Table 4.13 for a full list of the statements). Again, a similar question was asked in the 2014 NAP–ICT Literacy student survey, relating to the importance of using computers (rather than digital devices). The 2014 results have also been included for reference, as the student responses are still relevant to the description of students' ratings of the importance of ICT. Due to the change in wording in the question stem, however, any changes over time should be interpreted with caution.

Table 4.13 Category percentages for students' recognition of the importance of working with digital devices in 2017, and percentages of agreement in comparison with 2014

	Importance of working with digital devices	Strongly agree	Agree	Disagree	Strongly disagree	% Agreement	
						2017	2014
Year 6	I like using digital devices* because they help me improve the quality of my work.	32 (±2.0)	56 (±1.9)	10 (±1.1)	2 (±0.5)	88 (±1.2)	82 (±1.3)
	I like using digital devices* because they make work easier.	39 (±1.9)	47 (±1.8)	11 (±1.1)	3 (±0.6)	86 (±1.2)	83 (±1.3)
	I enjoy using digital devices* because they help me to work with others.	24 (±1.8)	46 (±1.6)	26 (±1.6)	4 (±0.7)	70 (±1.7)	66 (±1.8)
	I enjoy using digital devices* because they help me communicate with my friends.	44 (±1.8)	38 (±1.6)	13 (±1.1)	5 (±0.6)	82 (±1.3)	74 (±1.7)
	I like using digital devices* to find new ways to do things.	42 (±1.8)	47 (±1.6)	9 (±0.9)	2 (±0.6)	89 (±1.0)	82 (±1.5)
	It is very important to me to work with a digital device.*	19 (±1.5)	36 (±1.6)	35 (±1.8)	10 (±1.0)	55 (±2.1)	77 (±1.9)
Year 10	I like using digital devices* because they help me improve the quality of my work.	35 (±1.8)	55 (±1.8)	7 (±1.0)	2 (±0.4)	91 (±1.1)	87 (±1.4)
	I like using digital devices* because they make work easier.	43 (±1.8)	48 (±1.7)	8 (±1.1)	2 (±0.4)	91 (±1.1)	89 (±1.2)
	I enjoy using digital devices* because they help me to work with others.	25 (±1.6)	51 (±1.8)	21 (±1.5)	3 (±0.5)	76 (±1.5)	66 (±2.1)
	I enjoy using digital devices* because they help me communicate with my friends.	50 (±1.6)	41 (±1.6)	7 (±1.0)	2 (±0.4)	91 (±1.1)	84 (±1.4)
	I like using digital devices* to find new ways to do things.	41 (±1.7)	50 (±1.7)	8 (±0.9)	1 (±0.5)	90 (±0.9)	77 (±1.7)
	It is very important to me to work with a digital device.*	24 (±1.7)	42 (±1.6)	28 (±1.7)	5 (±0.7)	66 (±1.9)	79 (±1.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

** In 2014 "computers" was used instead of "digital devices".*

In 2017, most items showed high levels of agreement at both year levels, but Year 10 students tended to show slightly higher levels of agreement. The two items showing lower levels of agreement were "I enjoy using digital devices because they help me to work with others" (70 per cent agreement for Year 6; 76 per cent agreement for Year 10) and "It is very important to me to work with a digital device" (55 per cent and 66 per cent agreement for Year 6 and Year 10 students, respectively).

Since 2014, the percentage of students agreeing with each statement has either increased or remained the same, except for "It is very important to me to work with a digital device", which showed a significant decrease in agreement. Students tended to agree that digital devices help them in a variety of ways when they are doing their work, but they don't necessarily consider it personally important to use digital devices for work. It is also possible that the change in percentage relates to the shift from the term "computer" to "digital device".

Following the same procedure used for the digital device self-efficacy scale, all six items in the question were used to derive a scale on the importance of digital devices (see Table 4.14 for scale scores for male and female students in both year levels). Year 10 students showed significantly higher ratings of the importance of digital devices. Males at both year levels showed significantly higher ratings of the importance of digital devices than females.

Table 4.14 Average scores on index of importance of digital devices for male and female students

Importance of digital devices	All students	Males	Females	Difference (M – F)
Year 6	50.0 (±0.4)	51.0 (±0.6)	49.0 (±0.6)	**2.0** (±0.7)
Year 10	52.2 (±0.4)	52.7 (±0.6)	51.6 (±0.6)	**1.1** (±0.9)
Difference (Year 10 – Year 6)	**2.2** (±0.6)	**1.8** (±0.8)	**2.7** (±0.8)	-0.9 (±1.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Students above the proficient standard tended to have significantly higher ratings of the importance of digital devices than students below (see Table 4.15). This effect was stronger for Year 10 students than Year 6. Year 6 female students above and below the proficient standard showed no significant difference in their ratings of the importance of digital devices.

Table 4.15 Average scores on index of importance of digital devices for students above and below the proficient standard overall and by gender

	Proficient standard	All students		Males		Females	
Year 6	Above	50.6	(±0.5)	52.0	(±0.7)	49.3	(±0.7)
	Below	49.2	(±0.6)	49.8	(±0.8)	48.5	(±0.8)
	Difference	**1.4**	(±0.7)	**2.2**	(±1.0)	0.9	(±1.0)
	Correlation	**0.10**	(±0.04)	**0.16**	(±0.05)	0.05	(±0.05)
Year 10	Above	53.2	(±0.6)	53.9	(±0.9)	52.5	(±0.8)
	Below	51.0	(±0.6)	51.5	(±0.9)	50.4	(±0.8)
	Difference	**2.2**	(±0.9)	**2.4**	(±1.4)	**2.1**	(±1.1)
	Correlation	**0.15**	(±0.04)	**0.17**	(±0.06)	**0.13**	(±0.05)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

The correlation between students' ratings of the importance of digital devices and achievement was significant but weak (between 0.10 and 0.17). There was no correlation between Year 6 female students' ratings of the importance of digital devices and their NAP–ICT Literacy scale scores.

5

Student use of applications

Chapter highlights

- The most frequently reported activity on the study utility index by both Year 6 and Year 10 students was searching the internet for information for study or schoolwork. This was true regardless of location (that is, both at school and outside of school).
- Utilities that the majority of students reported as rarely used at school and outside of school were entering data in a spreadsheet, organising a program of work on a topic using a learning management system and reflecting on learning experiences.
- Year 6 students with lower ICT achievement were significantly more likely to report frequent use of their digital devices for study utility at school than those students with higher ICT achievement.
- Outside of school, male students were significantly more likely to report using entertainment applications than female students.
- For both Year 6 and Year 10, students with lower ICT literacy achievement were significantly more likely to report frequent use of entertainment applications when at school. This was particularly true for students in Year 6 and for male students in both year levels.
- The vast majority of Year 6 students reported that they rarely used their devices for communication purposes when at school, while a third of Year 10 students reported using their devices frequently for emailing, chatting and communicating with others via social media while at school.
- Both Year 6 and Year 10 students reported using their devices outside of school most frequently for the purposes of chatting, and for communicating with others via social media.
- Lower achieving Year 6 students reported significantly more frequent use of communication applications than did higher achieving students. This was true for both female and male Year 6 students and male Year 10 students.

- Both Year 6 and Year 10 students reported undertaking technological activities far less frequently than activities relating to study, entertainment and communication. Between 60 and 90 per cent of students rarely engaged in technological tasks at school or outside of school.
- Male students were significantly more likely to report completion of technological tasks using digital technologies than females, especially among Year 10 students.
- For Year 6 students, there was a significant negative association between ICT literacy achievement and frequency of use of digital devices to complete technological tasks.

Introduction

Following on from the analyses presented in the preceding chapter regarding students' use of and access to digital devices, this chapter examines students' use of applications on digital devices. We then look at how students' reported use of applications is associated with achievement in the NAP–ICT Literacy assessment.

As for previous cycles of NAP–ICT Literacy, the student survey asked students to specify the extent to which they completed a range of tasks on digital devices, both at school and outside of school.[1] Students were, for example, asked how often they used a particular piece of software (such as a communication tool like Skype or FaceTime) or how often they undertook a particular task on a digital device (for example, how often they entered data into a spreadsheet).

The tasks students were asked about were grouped according to the types of application use they represented:

- use of study utilities on digital devices
- use of entertainment applications on digital devices
- use of digital devices for communication purposes
- completion of technological tasks using digital devices.

Students indicated the frequency with which they performed tasks relating to each type of application use, both at school and outside of school. For each task, students selected one response from six possible categories ranging from "At least once every day" to "Never".[2] Based on the frequencies of student responses by category, these six categories

[1] For these items, there was a small but important change in terminology from previous cycles—the term "at home" was changed to "outside of school". This change in terminology is substantial enough to render direct comparisons between 2017 and previous assessment cycles unfeasible for these particular items.

[2] The complete list of response categories for these items is as follows: 1 = "At least once every day"; 2 = "Almost every day"; 3 = "A few times each week"; 4 = "Between once a week and once a month"; 5 = "Less than once a month"; 6 = "Never".

were re-classified into three categories for reporting: “Rarely” (less than once per month or never), “Occasionally” (between a few times per week and once a month) and “Frequently” (almost every day or more frequently).

Each section described one type of application. First, the frequencies with which students in both Year 6 and Year 10 reported completing each type of task were presented both at school and outside of school.

In order to compare the use of types of applications by different sub-groups of students, scales were derived for each of the four application use types (study utilities, entertainment, communication and technological uses). Item response theory (IRT) was applied to derive scale scores for students for each of the four application use types both for at school and outside of school. The resulting scale scores were standardised to provide a metric in which the national average score for Year 6 students was 50, with a standard deviation of 10. Further information about how these scaling analyses were performed, together with information about reliabilities and related analytic procedures, are provided in the *NAP–ICT Literacy 2017 Technical Report*. For each index, average scale scores were compared between year levels and gender groups for both at school and outside of school.

In order to explore the associations between students’ reported use of applications on digital devices and their achievement in the NAP–ICT Literacy assessment, two methods of association are reported in this section. The first method compares the average survey scale scores between students who are above and below the NAP–ICT Literacy proficient standard. These scores are presented for each of the four application use types discussed in this chapter. This method helps to explain whether students with greater achievement in ICT report different frequencies of application use on digital devices, as compared to those with a lower ICT achievement.

The second method reports the correlation between NAP–ICT Literacy scale scores and each of the four “use of application” indices. Pearson’s correlation coefficients assume values between –1 and +1. A positive correlation between NAP–ICT Literacy scale scores and the “use of application” index would mean that any increase in student achievement corresponds to an increase in the “use of application” scale score, while a negative correlation indicates an association in which an increase in one measure corresponds to a decrease in the other measure.

While there are no scientific rules for interpreting the strength of correlation coefficients[3], for the purposes of survey data in social research, statistically significant coefficients below ±0.1 are typically described as “not substantial”, between ±0.1 and ±0.3 as “weak”, between ±0.3 and ±0.5 as “moderate” and above ±0.5 as “strong”.

[3] When reporting correlation coefficients, an assumption is made that the relationship between the two measures is linear.

Frequency of use of applications at school and outside of school

Use of study utilities on digital devices

As in previous cycles of the NAP–ICT Literacy, the survey asked students to consider the frequency with which they performed tasks that were typically associated with study activities. Table 5.1 presents the frequency with which each study utility task was undertaken at school and outside of school, for Year 6 and Year 10 students.

Table 5.1 Frequency percentages of use of study utilities on digital devices

	Use of study utilities on digital devices	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
At school	Search the Internet for information for study or school work	5 (±0.8)	45 (±2.5)	50 (±2.7)	4 (±0.7)	24 (±2.0)	72 (±2.3)
	Use word processing software or apps to write documents	17 (±1.6)	53 (±2.2)	30 (±2.4)	9 (±1.4)	35 (±2.2)	57 (±2.3)
	Use spreadsheets to draw a graph or perform calculations	47 (±2.2)	40 (±2.0)	13 (±1.5)	42 (±2.2)	48 (±2.1)	10 (±1.3)
	Use mathematics, language or other learning programs on a computer	22 (±2.0)	52 (±1.8)	26 (±1.9)	39 (±2.3)	41 (±1.9)	20 (±1.5)
	Enter data in a spreadsheet	54 (±2.0)	36 (±1.9)	10 (±1.1)	56 (±2.1)	36 (±2.0)	8 (±1.0)
	Create presentations for school projects	28 (±2.3)	59 (±2.0)	13 (±1.4)	21 (±1.7)	67 (±1.8)	12 (±1.2)
	Contribute written material or digital products (e.g. art work or photographic images) to online content	49 (±2.2)	38 (±1.9)	13 (±1.3)	47 (±2.1)	37 (±1.7)	16 (±1.5)
	Watch online videos to support your own learning	32 (±2.1)	53 (±2.2)	16 (±1.5)	29 (±2.2)	52 (±1.9)	19 (±1.8)
	Organising your program of work on a topic using a learning management system (e.g. a Moodle, Compass)	57 (±2.5)	32 (±2.3)	11 (±1.6)	54 (±3.1)	26 (±2.2)	20 (±2.2)
	Reflecting on your learning experiences (e.g. through a blog)	63 (±2.7)	25 (±2.2)	12 (±1.4)	77 (±2.2)	15 (±1.6)	8 (±1.3)

Table 5.1 (continued)

	Use of study utilities on digital devices	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
Outside school	Search the Internet for information for study or school work	19 (±1.6)	45 (±2.0)	36 (±2.0)	8 (±1.2)	32 (±1.9)	60 (±2.1)
	Use word processing software or apps to write documents	46 (±2.2)	37 (±2.0)	16 (±1.5)	18 (±1.6)	45 (±2.3)	37 (±2.2)
	Use spreadsheets to draw a graph or perform calculations	73 (±1.8)	20 (±1.6)	7 (±1.0)	65 (±1.9)	28 (±1.8)	6 (±0.9)
	Use mathematics, language or other learning programs on a computer	49 (±2.2)	35 (±1.9)	16 (±1.6)	57 (±2.2)	30 (±1.8)	13 (±1.3)
	Enter data in a spreadsheet	78 (±1.6)	17 (±1.4)	5 (±0.9)	73 (±1.9)	22 (±1.6)	6 (±0.8)
	Create presentations for school projects	51 (±2.6)	40 (±2.3)	9 (±1.3)	37 (±1.8)	55 (±1.8)	8 (±1.1)
	Contribute written material or digital products (e.g. art work or photographic images) to online content	58 (±1.9)	29 (±1.8)	12 (±1.4)	52 (±1.8)	32 (±1.5)	15 (±1.4)
	Watch online videos to support your own learning	46 (±1.9)	34 (±1.9)	19 (±1.4)	34 (±2.2)	40 (±2.0)	26 (±2.0)
	Organising your program of work on a topic using a learning management system (e.g. a Moodle, Compass)	75 (±2.0)	19 (±1.5)	7 (±1.3)	65 (±2.6)	22 (±1.8)	14 (±1.6)
	Reflecting on your learning experiences (e.g. through a blog)	76 (±2.0)	16 (±1.7)	8 (±1.1)	81 (±1.8)	13 (±1.4)	6 (±1.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

Rarely = less than once a month or never

Occasionally = between a few times a week and once a month

Frequently = almost every day or more

Students reported frequently using various study utilities both at school and outside of school. The most frequently reported activity was searching the internet for information for study or schoolwork. Over 70 per cent of Year 10 students and 50 per cent of Year 6 students reported that they frequently did this at school, and 60 per cent of Year 10 and 36 per cent of Year 6 students reported that they frequently did this outside of school.

Using word-processing software or apps to write documents was also reported as one of the most frequent activities engaged in by students both at school and outside of school. A total of 57 per cent of Year 10 students and 30 per cent of Year 6 students reported that they frequently did this at school, and 37 per cent of Year 10 and 16 per cent of Year 6 students reported that they frequently did this outside of school.

Study utilities that the majority of students rarely used at school and outside of school were for entering data in a spreadsheet, for organising a program of work on a topic using a learning management system and for reflecting on learning experiences.

As described at the start of this chapter, an index was created for the items measuring use of study utilities on digital devices at school and outside of school. Average scale scores on these indices are recorded in Table 5.2. At school, differences in the use of study utilities were negligible between year levels and between male and female students. Outside of school, Year 10 students made significantly more use of study utilities than Year 6 students. Differences between the genders were negligible.

Table 5.2 Average scores on use of study utilities on digital devices at school and outside of school overall and by gender

		All students	Males	Females	Difference (M – F)
At school	Year 6	50.0 (±0.5)	50.5 (±0.5)	49.4 (±0.6)	**1.1** (±0.6)
	Year 10	50.9 (±0.5)	51.4 (±0.7)	50.4 (±0.7)	**1.0** (±0.9)
	Difference (Year 10 – Year 6)	**0.9** (±0.7)	0.8 (±0.9)	**1.0** (±0.9)	
Outside of school	Year 6	50.0 (±0.5)	49.7 (±0.6)	50.3 (±0.6)	**-0.6** (±0.6)
	Year 10	53.0 (±0.4)	53.0 (±0.5)	53.1 (±0.5)	-0.1 (±0.7)
	Difference (Year 10 – Year 6)	**3.0** (±0.6)	**3.3** (±0.8)	**2.7** (±0.8)	

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Table 5.3 presents the average study utility scale score for groups of students above and below the proficient standard of NAP–ICT Literacy for both year levels and by gender. Interestingly, significantly higher average scale scores for use of study utilities at school were evident for those students below the proficient standard in the Year 6 cohort. This implies that Year 6 students with lower ICT literacy achievement were more likely to report frequent use of study utilities on their digital devices at school. The correlation was statistically significant but its strength was weak both overall (–0.11) and when analysed by gender (–0.13 for males and –0.09 for females). At Year 10, this pattern was evident only for male students but the strength of the association was not meaningful.

Table 5.3 Average scores on use of study utilities on digital devices for students above and below the proficient standard overall and by gender

	Proficient Standard	At school			Outside of school		
		All students	Males	Females	All students	Males	Females
Year 6	Above	49.2 (±0.6)	49.5 (±0.7)	48.8 (±0.7)	49.9 (±0.5)	49.7 (±0.7)	50.2 (±0.6)
	Below	51.1 (±0.7)	51.7 (±0.8)	50.3 (±1.0)	50.1 (±0.8)	49.8 (±0.9)	50.5 (±1.0)
	Difference	**-1.9** (±0.8)	**-2.2** (±1.0)	**-1.5** (±1.1)	-0.2 (±0.8)	-0.1 (±1.1)	-0.3 (±1.1)
	Correlation	**-0.11** (±0.0)	**-0.13** (±0.1)	**-0.09** (±0.1)	-0.03 (±0.0)	-0.03 (±0.1)	-0.03 (±0.1)
Year 10	Above	50.5 (±0.7)	50.7 (±1.0)	50.4 (±0.9)	53.7 (±0.4)	53.8 (±0.6)	53.5 (±0.6)
	Below	51.4 (±0.7)	52.2 (±0.9)	50.4 (±1.1)	52.2 (±0.7)	52.0 (±0.9)	52.4 (±0.9)
	Difference	-0.9 (±1.0)	**-1.5** (±1.4)	0.0 (±1.5)	**1.5** (±0.8)	**1.8** (±1.1)	1.1 (±1.2)
	Correlation	**-0.07** (±0.1)	**-0.09** (±0.1)	-0.03 (±0.1)	**0.06** (±0.1)	0.05 (±0.1)	0.07 (±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

Perhaps unsurprisingly, Year 10 students with achievement above the proficient standard reported significantly more frequent use of study applications when outside of school than did those students with achievement below the proficient standard. No associations between study utility scale scores and ICT achievement were found for the Year 6 cohort when outside of school.

Use of entertainment applications on digital devices

The survey also asked students to report on the frequency with which they completed entertainment-related activities on digital devices. Students reported doing these activities more frequently when outside of school than at school, and this was true across both year levels (see Table 5.4).

Table 5.4 Frequency percentages of use of entertainment applications on digital devices

	Use of entertainment applications on digital devices	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
At school	Watch downloaded or streamed videos for entertainment	80 (±1.7)	15 (±1.4)	5 (±0.9)	64 (±2.1)	24 (±1.6)	12 (±1.4)
	Play single-player games	63 (±2.6)	28 (±1.9)	8 (±1.4)	65 (±2.2)	23 (±1.7)	12 (±1.3)
	Play multi-player games	70 (±2.2)	22 (±1.6)	7 (±1.2)	77 (±1.9)	16 (±1.5)	7 (±1.0)
	Use software to create sounds/music, movies, animations or artwork	56 (±2.3)	37 (±2.4)	7 (±0.9)	60 (±2.1)	28 (±1.7)	12 (±1.3)
	Listen to downloaded or streamed music or other audio for entertainment	69 (±2.4)	21 (±1.7)	10 (±1.5)	31 (±1.9)	22 (±1.7)	47 (±2.1)

Table 5.4 (continued)

	Use of entertainment applications on digital devices	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
Outside of school	Watch downloaded or streamed videos for entertainment	15 (±1.5)	32 (±1.8)	53 (±1.9)	8 (±1.0)	27 (±1.7)	65 (±1.8)
	Play single-player games	16 (±1.5)	37 (±1.8)	47 (±2.2)	30 (±2.1)	34 (±1.6)	36 (±1.7)
	Play multi-player games	31 (±1.8)	34 (±1.9)	35 (±1.8)	44 (±2.4)	27 (±1.7)	29 (±1.7)
	Use software to create sounds/music, movies, animations or artwork	45 (±2.0)	32 (±1.9)	23 (±1.7)	50 (±1.9)	28 (±1.6)	22 (±1.6)
	Listen to downloaded or streamed music or other audio for entertainment	18 (±1.3)	29 (±1.6)	53 (±1.7)	6 (±0.8)	14 (±1.3)	79 (±1.6)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

Rarely = less than once a month or never

Occasionally = between a few times a week and once a month

Frequently = almost every day or more

The majority of Year 6 and Year 10 students reported that they rarely used applications at school to perform the presented entertainment activities, with the exception of listening to downloaded or streamed music for Year 10. Outside of school, the percentages varied by activity and by year level.

Outside of school, Year 6 students reported most frequently watching downloaded or streamed videos for entertainment, and listening to downloaded or streamed music for entertainment (53 per cent for each activity). These activities were undertaken even more frequently by Year 10 students with almost 80 per cent of Year 10 students reporting that they frequently used digital devices to listen to music when outside of school, and only 6 per cent reporting that they rarely undertook this activity. A sizeable proportion (65 per cent) also reported frequently watching downloaded or streamed videos for entertainment, with just 8 per cent reporting that they rarely performed this activity.

Average scale scores on the indices that were created for these questions showed that, at school, entertainment applications were significantly more often used by students in Year 10 than by students in Year 6 (see Table 5.5). The size of the difference was moderate (3.7 score points). Difference between male and female students was negligible in Year 6 (0.8 score points) and small in Year 10 (2.1 score points) with male students reporting more use of entertainment applications at school than female students.

Table 5.5 Average scores on use of entertainment applications on digital devices at school and outside of school overall and by gender

		All students		Males		Females		Difference (M – F)	
At school	Year 6	50.0	(±0.5)	50.4	(±0.7)	49.6	(±0.6)	**0.8**	(±0.8)
	Year 10	53.7	(±0.5)	54.7	(±0.7)	52.6	(±0.6)	**2.1**	(±0.9)
	Difference (Year 10 – Year 6)	**3.7**	(±0.7)	**4.3**	(±1.0)	**3.0**	(±0.8)		
Outside of school	Year 6	50.0	(±0.4)	51.7	(±0.6)	48.2	(±0.5)	**3.4**	(±0.8)
	Year 10	50.3	(±0.4)	53.2	(±0.5)	47.2	(±0.5)	**6.0**	(±0.7)
	Difference (Year 10 – Year 6)	0.3	(±0.6)	**1.5**	(±0.8)	**-1.1**	(±0.7)		

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Outside of school, male students in Year 10 reported significantly more use of entertainment applications than male students in Year 6 (1.5 score points). In contrast, female Year 10 students reported significantly less use than female Year 6 students (–1.1 score points). At both year levels, male students reported significantly more use of entertainment applications than female students. This difference was large at Year 10 (6.0 score points) and moderate at Year 6 (3.4 score points).

Table 5.6 shows the average survey scale scores on the entertainment index for different subsets of students both above and below the proficient standard. Significantly higher average scale scores for use of entertainment applications at school were apparent for students below the proficient standard compared with those for students above the proficient standard. What this means is that students with lower ICT achievement reported more frequent use of entertainment applications at school than students with higher ICT achievement. This was evident for both Year 6 students (with a difference of 2.4 scale points) and Year 10 students (with a difference of 1.3 scale points). While the correlation was significant at both year levels, the strength of the correlation was nonetheless weak for all groups, with the exception of female students in Year 10, for whom no correlation was found between the use of entertainment applications at school and achievement.

Table 5.6 Average scores on use of entertainment applications on digital devices for students above and below the proficient standard overall and by gender

	Proficient standard	At school			Outside of school		
		All students	Males	Females	All students	Males	Females
Year 6	Above	48.9 (±0.6)	49.1 (±0.9)	48.8 (±0.7)	49.8 (±0.5)	51.7 (±0.8)	47.9 (±0.6)
	Below	51.4 (±0.7)	51.9 (±0.9)	50.7 (±0.9)	50.3 (±0.6)	51.7 (±0.9)	48.7 (±0.9)
	Difference	**-2.4** (±0.7)	**-2.8** (±1.1)	**-1.9** (±0.9)	-0.5 (±0.8)	0.0 (±1.2)	-0.7 (±1.1)
	Correlation	**-0.16** (±0.0)	**-0.17** (±0.1)	**-0.15** (±0.0)	-0.02 (±0.0)	0.02 (±0.1)	-0.05 (±0.0)
Year 10	Above	53.1 (±0.6)	53.8 (±0.9)	52.4 (±0.7)	50.2 (±0.5)	53.5 (±0.7)	46.9 (±0.6)
	Below	54.4 (±0.8)	55.6 (±1.0)	52.8 (±1.1)	50.6 (±0.6)	52.9 (±0.8)	47.5 (±0.8)
	Difference	**-1.3** (±0.9)	**-1.9** (±1.3)	-0.4 (±1.4)	-0.4 (±0.8)	0.6 (±1.1)	-0.6 (±1.0)
	Correlation	**-0.12** (±0.1)	**-0.15** (±0.1)	-0.06 (±0.1)	-0.01 (±0.0)	0.04 (±0.1)	-0.03 (±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold.***

There was no discernible association between students' use of entertainment applications outside of school and their ICT achievement for either year level or gender.

Use of digital devices for communication

Students reported on the frequency with which they use digital devices for the purposes of communication. Table 5.7 shows the percentages of Year 6 and Year 10 students reporting how often they performed each of these activities, both at school and outside of school.

Table 5.7 Frequency percentages of use of digital devices for communication purposes

	Use of digital devices for communication purposes	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
At school	Emailing	65 (±3.5)	26 (±2.6)	9 (±1.5)	25 (±2.1)	39 (±2.5)	36 (±3.1)
	Chatting	75 (±2.1)	10 (±1.3)	15 (±1.5)	45 (±2.2)	20 (±1.3)	35 (±2.1)
	Write or reply to blogs or forum threads	89 (±1.6)	8 (±1.5)	3 (±0.7)	85 (±1.6)	10 (±1.1)	5 (±0.9)
	Use voice or video chat to communicate with people online (e.g. Skype, FaceTime)	93 (±1.2)	4 (±0.9)	3 (±0.7)	84 (±1.6)	10 (±1.0)	6 (±1.0)
	Upload text, images or video to an online profile	87 (±1.5)	9 (±1.2)	4 (±0.7)	77 (±1.8)	16 (±1.4)	7 (±1.0)
	Communicate with others using social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)	93 (±1.2)	4 (±0.6)	4 (±0.9)	53 (±2.3)	15 (±1.3)	32 (±2.1)

Table 5.7 (continued)

	Use of digital devices for communication purposes	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
Outside of school	Emailing	53 (±1.8)	27 (±1.5)	20 (±1.3)	29 (±1.8)	42 (±1.9)	29 (±2.1)
	Chatting	22 (±1.6)	23 (±1.5)	55 (±2.0)	7 (±1.1)	12 (±1.0)	80 (±1.2)
	Write or reply to blogs or forum threads	78 (±1.5)	12 (±0.9)	9 (±1.2)	76 (±1.7)	15 (±1.2)	9 (±1.0)
	Use voice or video chat to communicate with people online (e.g. Skype, FaceTime)	36 (±1.8)	36 (±1.6)	28 (±1.8)	36 (±1.6)	36 (±1.2)	28 (±1.6)
	Upload text, images or video to an online profile	52 (±2.0)	30 (±1.6)	19 (±1.4)	35 (±2.1)	41 (±1.7)	24 (±1.8)
	Communicate with others using social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)	37 (±2.3)	22 (±1.2)	42 (±2.4)	7 (±1.0)	12 (±1.1)	81 (±1.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

Rarely = less than once a month or never

Occasionally = between a few times a week and once a month

Frequently = almost every day or more

When at school, the vast majority of Year 6 students reported rarely using their devices for these communication purposes, but a third of all Year 10 students reported frequently using their devices for emailing (36 per cent), chatting (35 per cent) and communicating with others using social media (32 per cent) when at school.

In terms of their behaviour outside of school, both Year 6 and Year 10 students reported using their devices most frequently for the purposes of chatting and for social media. More than half of Year 6 students (55 per cent) reported using their devices frequently for chatting with others outside of school, while 42 per cent reported using social media applications. At Year 10, 80 per cent of students reported using their devices for chatting, and a similar proportion (81 per cent) reported using them to communicate with others via social media applications.

At school, differences in scale scores on the use of digital devices for communication were large between Year 6 and Year 10 (9.9 score points; see Table 5.8). Differences between male and female students were negligible.

Table 5.8 Average scores on use of digital devices for communication at school and outside of school overall and by gender

		All students	Males	Females	Difference (M – F)
At school	Year 6	50.0 (±0.7)	50.4 (±0.7)	49.6 (±0.7)	**0.8** (±0.7)
	Year 10	59.9 (±0.5)	59.7 (±0.7)	60.0 (±0.6)	-0.3 (±0.9)
	Difference (Year 10 – Year 6)	**9.9** (±0.8)	**9.4** (±1.0)	**10.5** (±1.0)	
Outside of school	Year 6	50.0 (±0.4)	49.9 (±0.6)	50.1 (±0.5)	-0.3 (±0.7)
	Year 10	54.7 (±0.3)	54.5 (±0.4)	55.0 (±0.4)	-0.5 (±0.6)
	Difference (Year 10 – Year 6)	**4.7** (±0.5)	**4.7** (±0.7)	**4.8** (±0.7)	

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Outside of school, the significant difference between the year levels was moderate in size (4.7 score points). No significant differences between the gender groups were found.

Table 5.9 shows the relationship between students' use of digital devices for communication purposes and students' levels of ICT achievement. Lower achieving Year 6 students reported significantly more frequent use of communication applications when at school than did students achieving above the proficient standard. The association was statistically significant, though weak, for both genders and overall.

Table 5.9 Average scores on use of digital devices for communication purposes for students above and below the proficient standard overall and by gender

		At school			Outside of school		
	Proficient standard	All students	Males	Females	All students	Males	Females
Year 6	Above	49.2 (±0.7)	49.5 (±0.9)	49.0 (±0.8)	49.5 (±0.5)	49.1 (±0.8)	49.9 (±0.7)
	Below	51.0 (±0.9)	51.5 (±1.1)	50.4 (±1.1)	50.6 (±0.6)	50.8 (±0.8)	50.5 (±0.8)
	Difference	**-1.8** (±0.9)	**-2.0** (±1.3)	**-1.4** (±1.1)	**-1.1** (±0.7)	**-1.7** (±1.1)	-0.6 (±1.1)
	Correlation	**-0.13** (±0.1)	**-0.14** (±0.1)	**-0.12** (±0.1)	**-0.05** (±0.0)	**-0.07** (±0.0)	-0.04 (±0.1)
Year 10	Above	59.5 (±0.6)	59.1 (±0.9)	59.9 (±0.8)	55.0 (±0.3)	54.8 (±0.5)	55.1 (±0.4)
	Below	60.4 (±0.7)	60.4 (±1.0)	60.3 (±0.9)	54.5 (±0.5)	54.2 (±0.7)	54.8 (±0.7)
	Difference	**-0.9** (±0.9)	**-1.3** (±1.3)	-0.5 (±1.1)	0.5 (±0.5)	0.7 (±0.8)	0.2 (±0.7)
	Correlation	**-0.06** (±0.0)	**-0.09** (±0.1)	-0.04 (±0.1)	**0.04** (±0.0)	0.05 (±0.1)	0.02 (±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

A similar pattern was found for Year 6 male students when outside of school, and also for Year 10 male students when at school. These relationships were not apparent for female students.

Completion of technological tasks using digital devices

Students reported on the frequency with which they used digital devices to engage in a range of technological tasks (tasks requiring higher levels of specialised technical skill). These data are shown in Table 5.10. Across both year levels, students reported undertaking technological activities far less frequently than activities relating to study utilities, entertainment or communication. This was true regardless of location (at school and outside of school). Between 60 and 90 per cent of the students rarely engaged in those activities at school or outside of school.

Table 5.10 Frequency percentages of completion of technological tasks using digital technologies

	Completion of technological tasks using digital technologies	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
At school	Write code, programs or macros (e.g. HTML, JavaScript, Java, C+, Xcode, Swift, SDK)	81 (±2.1)	16 (±1.9)	3 (±0.7)	81 (±1.7)	15 (±1.5)	4 (±0.8)
	Create programs with a visual coding tool (e.g. Scratch, Kodable, GameMaker)	69 (±3.1)	27 (±2.8)	4 (±0.8)	86 (±1.5)	11 (±1.3)	3 (±0.6)
	Upload media you have created to the Internet	91 (±1.3)	6 (±0.9)	3 (±0.7)	85 (±1.6)	12 (±1.3)	3 (±0.7)
	Construct websites	89 (±1.4)	9 (±1.2)	3 (±0.7)	89 (±1.4)	8 (±1.1)	3 (±0.7)
	Use drawing, painting or graphics programs	65 (±2.3)	29 (±2.2)	6 (±0.9)	70 (±2.1)	24 (±1.7)	6 (±0.9)
	Use software to find and get rid of computer viruses	88 (±1.4)	9 (±1.2)	3 (±0.6)	81 (±1.7)	13 (±1.2)	6 (±0.9)
	Remix or edit music, video, images or text to produce digital content	85 (±1.3)	12 (±1.2)	3 (±0.7)	78 (±1.6)	16 (±1.4)	6 (±1.1)

Table 5.10 (continued)

	Completion of technological tasks using digital technologies	Year 6			Year 10		
		Rarely	Occasionally	Frequently	Rarely	Occasionally	Frequently
Outside of school	Write code, programs or macros (e.g. HTML, JavaScript, Java, C+, Xcode, Swift, SDK)	84 (±1.2)	10 (±1.0)	5 (±0.9)	85 (±1.6)	10 (±1.3)	5 (±0.7)
	Create programs with a visual coding tool (e.g. Scratch, Kodable, GameMaker)	82 (±1.3)	13 (±1.1)	6 (±0.8)	88 (±1.4)	8 (±1.1)	3 (±0.6)
	Upload media you have created to the Internet	76 (±1.5)	16 (±1.2)	8 (±1.0)	77 (±1.8)	18 (±1.4)	5 (±0.9)
	Construct websites	88 (±1.2)	8 (±0.9)	4 (±0.8)	90 (±1.3)	7 (±1.0)	3 (±0.8)
	Use drawing, painting or graphics programs	62 (±1.7)	27 (±1.4)	10 (±1.2)	73 (±1.8)	21 (±1.7)	7 (±0.8)
	Use software to find and get rid of computer viruses	76 (±1.5)	16 (±1.2)	8 (±1.0)	67 (±2.0)	24 (±1.7)	9 (±1.1)
	Remix or edit music, video, images or text to produce digital content	62 (±1.6)	25 (±1.6)	13 (±1.1)	66 (±1.8)	24 (±1.4)	10 (±1.2)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

Rarely = less than once a month or never

Occasionally = between a few times a week and once a month

Frequently = almost every day or more

About one-third of Year 6 and Year 10 students reported that they at least occasionally used drawing, painting or graphics programs at school or outside of school. In addition, about one-third of all students used software at least occasionally outside of school to find and get rid of computer viruses and to remix or edit music, video, images or text to produce digital content.

The significant difference in completing technological tasks between Year 6 and Year 10 female students, both at school and outside of school, was small (–2.7 score points at school and –2.3 score points outside of school; see Table 5.11), with Year 6 students scoring higher than Year 10 students. This difference was not apparent for male students.

Table 5.11 Average scores on completion of technological tasks at school and outside of school overall and by gender

		All students	Males	Females	Difference (M – F)
At school	Year 6	50.0 (±0.6)	50.0 (±0.6)	50.0 (±0.7)	0.1 (±0.7)
	Year 10	48.7 (±0.5)	50.1 (±0.7)	47.3 (±0.6)	**2.8** (±0.9)
	Difference (Year 10 – Year 6)	**-1.3** (±0.8)	**0.0** (±1.0)	**-2.7** (±1.0)	
Outside of school	Year 6	50.0 (±0.3)	50.6 (±0.5)	49.3 (±0.5)	**1.3** (±0.7)
	Year 10	48.7 (±0.5)	50.2 (±0.6)	47.0 (±0.6)	**3.1** (±0.7)
	Difference (Year 10 – Year 6)	**-1.3** (±0.6)	**-0.5** (±0.8)	**-2.3** (±0.7)	

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences are in **bold**.*

Male students reported significantly more often completing technological tasks than female students, especially in Year 10, both at school and outside of school.

The relationships between students' ICT literacy achievement and their reported completion of technological tasks are shown in Table 5.12. For Year 6 students, there was a significant, negative, small association between ICT literacy achievement and frequency of use of digital devices to complete technological tasks. This means that the lower achieving students, both male and female, in Year 6 reported more frequent completion of technological tasks when at school than did the higher achieving students. The strength of the association was weak. This pattern was also apparent for Year 6 students when outside school, though there was little difference between the genders in this location (both having a difference of 1.7 scale points).

Table 5.12 Average scores on completion of technological tasks using digital technologies for students above and below the proficient standard overall and by gender

	Proficient standard	At school			Outside of school		
		All students	Males	Females	All students	Males	Females
Year 6	Above	49.3 (±0.7)	49.2 (±0.7)	49.4 (±0.9)	49.3 (±0.4)	49.9 (±0.6)	48.7 (±0.6)
	Below	51.0 (±0.8)	51.1 (±1.1)	50.8 (±1.0)	51.0 (±0.6)	51.6 (±0.8)	50.3 (±0.9)
	Difference	**-1.7** (±0.8)	**-1.9** (±1.2)	**-1.5** (±1.2)	**-1.7** (±0.7)	**-1.7** (±1.0)	**-1.7** (±1.1)
	Correlation	**-0.12** (±0.0)	**-0.13** (±0.1)	**-0.11** (±0.1)	**-0.10** (±0.0)	**-0.08** (±0.0)	**-0.12** (±0.1)
Year 10	Above	48.2 (±0.7)	49.6 (±1.0)	46.9 (±0.8)	48.6 (±0.5)	50.5 (±0.8)	46.8 (±0.7)
	Below	49.4 (±0.9)	50.5 (±1.1)	47.9 (±1.2)	48.8 (±0.7)	49.8 (±0.9)	47.5 (±1.0)
	Difference	-1.1 (±1.2)	-0.9 (±1.5)	-1.0 (±1.5)	-0.2 (±0.8)	0.6 (±1.2)	-0.7 (±1.3)
	Correlation	**-0.10** (±0.1)	**-0.10** (±0.1)	-0.07 (±0.1)	-0.04 (±0.0)	-0.01 (±0.1)	-0.06 (±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **51**.*

Among Year 10 male students, there was a weak but significant negative association between student ICT literacy achievement (above or below the proficient standard) and their frequency of use of digital devices to complete technological tasks.

6

Student experience of ICT at school

Chapter highlights

- Of the ICT-related tools for school-related purposes, students at both year levels were most likely to use word-processing software, presentation software and computer-based information resources. These types of software were more frequently used by Year 10 students.
- More frequent use of productivity applications (such as word processing and spreadsheet applications) was significantly, positively associated with achievement, whereas more frequent use of specialist applications (such as concept mapping or simulations and modelling applications) was significantly, negatively associated with achievement.
- Students reported that they were more likely than not to have learnt at school about how to look for different types of digital information on a topic, how to decide where to look for information about an unfamiliar topic and the need to provide references to content from webpages. Topics less frequently learnt included checking the credentials of software patches before downloading and accepting, and using software to find and get rid of viruses.
- A significant, weak association was found between attributing ICT learning to school purposes and achievement at Year 6, but no association was found at Year 10.
- Some of the most common activities using digital devices in class, across year levels, were teachers presenting information to the class, students presenting to the class, and students working on short assignments. The least common activities across both year levels was the use of the internet to contact either experts from outside the school or students from other schools about projects and creating or programming robotic devices.

- Frequency of use of digital devices in general classroom activities was significantly, positively associated with achievement, but frequency of use of digital devices in classroom activities requiring specialist software applications was significantly, negatively associated with achievement.
- In general, students reported receiving relatively little instruction in digital technologies–related tasks in comparison to issues relating to ICT literacy. This will likely change given that 2017 was the first year of implementation of the Australian Curriculum: Digital Technologies for a number of states and territories.
- A significant, negative association was found between the items that measure computational thinking–related learning at school and achievement.

Introduction

This chapter reports on students' use of digital devices at school. It begins by exploring the frequency with which students use different ICT-related applications for school-related purposes. It then progresses to discuss the types of ICT-related issues that are taught at school, and further discusses activities that take place in class using digital devices. Finally, this chapter concludes by presenting the results from a new survey question on digital technologies, with a focus on computational thinking. Associations between scales derived from these questions and achievement are explored throughout the chapter.

Use of ICT-related tools for school-related purposes

Students were asked to indicate the frequency ("Never", "Less than once a month", "At least once a month but not every week", "At least once a week"; see Table 6.1) with which they used different ICT-related tools for school-related purposes.

Table 6.1 Frequency percentages for use of ICT-related tools for school-related purposes

	How often do you use the following tools for school-related purposes?	Never		Less than once a month		At least once a month but not every week		At least once a week	
Year 6	Word processing software (e.g. Microsoft Word)	15	(±1.5)	21	(±1.6)	29	(±1.7)	35	(±2.5)
	Spreadsheet software (e.g. Microsoft Excel)	36	(±2.3)	33	(±2.0)	22	(±1.5)	9	(±1.0)
	Presentation software (e.g. Microsoft PowerPoint)	12	(±1.3)	28	(±1.8)	40	(±1.8)	20	(±1.7)
	Software for capturing and editing media	45	(±2.1)	27	(±1.5)	18	(±1.6)	10	(±1.1)
	Graphic design or drawing software	38	(±2.0)	32	(±1.7)	20	(±1.6)	11	(±1.1)
	Computer-based information resources (e.g. wiki, websites)	17	(±1.3)	20	(±1.5)	28	(±1.7)	35	(±2.0)
	Reflecting on your learning experiences (e.g. through a blog)	52	(±2.2)	22	(±1.5)	16	(±1.2)	10	(±1.5)
	Data logging or monitoring tools	55	(±1.8)	24	(±1.5)	14	(±1.3)	7	(±0.8)
	Concept mapping software (e.g. Inspiration)	57	(±2.0)	22	(±1.7)	15	(±1.4)	6	(±0.9)
	Simulations and modelling software	62	(±1.9)	21	(±1.4)	11	(±1.2)	6	(±1.0)
	Social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)	53	(±2.3)	13	(±1.4)	12	(±1.4)	22	(±2.1)
	Robotic devices	50	(±2.8)	26	(±1.9)	15	(±1.6)	9	(±1.3)
	3D printers	75	(±2.4)	12	(±1.5)	7	(±1.1)	5	(±1.0)
	Computer-aided drawing (CAD) software	70	(±2.2)	15	(±1.6)	8	(±1.1)	7	(±1.1)
	Communications software (e.g. Skype)	63	(±2.2)	14	(±1.5)	12	(±1.3)	11	(±1.4)

Table 6.1 (continued)

	How often do you use the following tools for school-related purposes?	Never	Less than once a month	At least once a month but not every week	At least once a week
Year 10	Word processing software (e.g. Microsoft Word)	5 (±0.9)	9 (±1.2)	20 (±1.8)	65 (±2.3)
	Spreadsheet software (e.g. Microsoft Excel)	19 (±1.6)	38 (±1.9)	31 (±1.6)	12 (±1.4)
	Presentation software (e.g. Microsoft PowerPoint)	4 (±0.8)	22 (±1.7)	47 (±1.9)	26 (±1.9)
	Software for capturing and editing media	28 (±1.9)	33 (±1.9)	24 (±1.6)	14 (±1.4)
	Graphic design or drawing software	39 (±1.9)	30 (±1.8)	18 (±1.3)	13 (±1.3)
	Computer-based information resources (e.g. wiki, websites)	7 (±1.0)	13 (±1.3)	26 (±1.5)	55 (±1.8)
	Reflecting on your learning experiences (e.g. through a blog)	60 (±2.3)	20 (±1.3)	12 (±1.4)	8 (±1.1)
	Data logging or monitoring tools	56 (±2.3)	25 (±1.6)	13 (±1.2)	7 (±1.1)
	Concept mapping software (e.g. Inspiration)	59 (±2.4)	23 (±1.8)	12 (±1.3)	6 (±0.9)
	Simulations and modelling software	60 (±2.4)	22 (±1.5)	11 (±1.5)	7 (±1.2)
	Social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)	28 (±2.0)	17 (±1.5)	16 (±1.4)	40 (±2.3)
	Robotic devices	68 (±2.1)	18 (±1.5)	8 (±1.1)	5 (±1.1)
	3D printers	70 (±2.2)	17 (±1.4)	8 (±1.2)	4 (±0.9)
	Computer-aided drawing (CAD) software	67 (±2.2)	17 (±1.5)	10 (±1.2)	7 (±1.1)
	Communications software (e.g. Skype)	53 (±2.0)	17 (±1.7)	15 (±1.4)	15 (±1.6)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

The most commonly used tools for Year 6 students were word-processing software, presentation software and computer-based information resources (such as wiki, websites). Each of these was reported to have been used at least once a month by 60 per cent or more of students. A similar pattern was shown for Year 10 students. Across both year levels, less frequently used tools included simulations and modelling software, 3D printers, and computer-aided drawing software. These were typically reported to have been used at least once a month by less than 20 per cent of students.

The largest differences across year levels (in terms of proportions of students using these tools at least once a month) were seen for word-processing software, social media, and computer-based information resources (all used more frequently by Year 10 students).

The following items were used to derive a scale on the use of productivity applications for school-related purposes:

- word-processing software (e.g. Microsoft Word)
- spreadsheet software (e.g. Microsoft Excel)
- presentation software (e.g. Microsoft PowerPoint)
- computer-based information resources (e.g. wiki, websites).

The second scale comprised items that required the use of specialist applications for school-related purposes. The following items were included in this scale:

- software for capturing and editing media
- graphic design or drawing software
- reflecting on your learning experiences (e.g. through a blog)
- data logging or monitoring tools
- concept mapping software (e.g. Inspiration)
- simulations and modelling software
- robotic devices
- 3D printers
- computer-aided drawing (CAD) software.

Associations between the use of ICT-related tools for school-related purposes and achievement were explored for the two derived scales from this question (see Table 6.2).

Table 6.2 Average scores on indices of use of ICT-related tools for school-related purposes for students above and below the proficient standard overall and by gender

Use of productivity applications for school-related purposes	Proficient standard	Overall		Males		Females	
Year 6	Above	51.8	(±0.6)	52.0	(±0.7)	51.6	(±0.8)
	Below	47.7	(±0.7)	47.7	(±0.9)	47.7	(±0.9)
	Difference	**4.1**	(±0.8)	**4.4**	(±1.1)	**3.9**	(±1.1)
	Correlation	**0.25**	(±0.0)	**0.25**	(±0.0)	**0.24**	(±0.1)
Year 10	Above	57.0	(±0.5)	57.5	(±0.8)	56.4	(±0.6)
	Below	52.7	(±0.7)	52.9	(±1.0)	52.4	(±0.8)
	Difference	**4.3**	(±0.9)	**4.7**	(±1.4)	**3.9**	(±1.1)
	Correlation	**0.27**	(±0.0)	**0.28**	(±0.1)	**0.26**	(±0.1)

Table 6.2 (continued)

Use of specialist applications for school-related purposes	Proficient standard	Overall		Male		Female	
Year 6	Above	49.0	(±0.5)	49.5	(±0.7)	48.5	(±0.7)
	Below	51.3	(±0.6)	51.8	(±0.7)	50.8	(±1.0)
	Difference	**-2.4**	(±0.7)	**-2.3**	(±1.1)	**-2.3**	(±1.1)
	Correlation	**-0.15**	(±0.0)	**-0.13**	(±0.1)	**-0.16**	(±0.0)
Year 10	Above	48.7	(±0.6)	50.2	(±0.9)	47.1	(±0.8)
	Below	50.9	(±0.8)	52.1	(±1.0)	49.3	(±1.1)
	Difference	**-2.2**	(±0.9)	**-1.8**	(±1.2)	**-2.2**	(±1.4)
	Correlation	**-0.13**	(±0.0)	**-0.10**	(±0.1)	**-0.14**	(±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

The scale measuring the use of productivity applications for school-related purposes was significantly, positively correlated with achievement for both Year 6 and Year 10. Additionally, students whose achievement scores were above the proficient standard tended to have significantly higher scores on this scale. These findings suggest a positive link between the use of such applications and ICT literacy. The association between this scale and ICT literacy performance was similar across gender groups and across year levels.

A contrasting pattern of associations can be observed for the scale measuring the use of specialist applications for school-related purposes. Weak but significant negative correlations suggest that students who reported greater use of these types of applications for their schooling tended to have lower levels of ICT literacy. This finding was supported by the fact that students performing below the proficient standard scored significantly higher, on average, than students whose achievements were above the proficient standard. This finding was consistent across gender groups and across year levels.

It should be noted that the skills assessed in NAP–ICT Literacy are more closely aligned with those required for understanding how to use productivity applications in contrast to specialist applications, which may explain the contrasting pattern of associations between these scales and achievement.

ICT learning at school

Students were asked whether they had learnt about 10 different issues related to ICT at school (see Table 6.3).

Table 6.3 Percentages of students attributing ICT learning to school in 2017 and in comparison with 2014

	At school, have you learnt about the following issues? (Proportion of students selecting Yes)	2017		2014	
Year 6	The need to provide references to content from webpages that you include in your schoolwork	69	(±1.8)	73	(±1.9)
	The need to know whether you have copyright permission to download music or video	66	(±1.9)	66	(±1.9)
	The problems of using software to copy or download files for free (such as games or videos) that you otherwise would have to pay for[1]	52	(±1.9)	53	(±2.0)
	Checking the credentials of software patches before downloading and accepting them	47	(±1.8)	51	(±2.2)
	Changing your password for internet services (e.g. email) regularly	57	(±2.2)	62	(±2.0)
	Reporting spam to an authority (such as a teacher or parent)	58	(±2.1)	62	(±1.9)
	Reading licence or usage agreements before you click on 'I agree' to install new software	63	(±1.8)	66	(±1.9)
	How to decide where to look for information about an unfamiliar topic	73	(±1.5)	74	(±1.8)
	How to look for different types of digital information on a topic	75	(±1.3)	74	(±1.6)
	Use software to find and get rid of computer viruses[2]	32	(±1.9)	48	(±2.1)

Table 6.3 (continued)

	At school, have you learnt about the following issues? (Proportion of students selecting Yes)	2017		2014	
Year 10	The need to provide references to content from webpages that you include in your schoolwork	91	(±1.2)	89	(±1.3)
	The need to know whether you have copyright permission to download music or video	72	(±1.6)	71	(±1.7)
	The problems of using software to copy or download files for free (such as games or videos) that you otherwise would have to pay for[1]	60	(±2.0)	58	(±1.5)
	Checking the credentials of software patches before downloading and accepting them	48	(±1.9)	48	(±1.8)
	Changing your password for internet services (e.g. email) regularly	71	(±2.0)	73	(±1.7)
	Reporting spam to an authority (such as a teacher or parent)	52	(±2.0)	55	(±1.9)
	Reading licence or usage agreements before you click on 'I agree' to install new software	61	(±1.9)	61	(±1.9)
	How to decide where to look for information about an unfamiliar topic	74	(±1.7)	74	(±1.8)
	How to look for different types of digital information on a topic	76	(±1.6)	74	(±1.7)
	Use software to find and get rid of computer viruses[2]	39	(±2.1)	53	(±2.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

[1] 2014 wording: "The problems of using software to copy computer files for free (such as games or videos) that you otherwise would have to pay for".

[2] 2014 wording: "Keeping anti-virus software up to date".

The same question was used in the NAP–ICT Literacy 2014 survey, with only two modifications made to individual items in 2017. The issues that were most commonly confirmed by students were how to look for different types of digital information on a topic (Year 6: 75 per cent; Year 10: 76 per cent), how to decide where to look for information about an unfamiliar topic (Year 6: 73 per cent; Year 10: 74 per cent) and the need to provide references to content from webpages that you include in your schoolwork (Year 6: 69 per cent; Year 10: 91 per cent).

The largest difference between year levels in the percentage of students reporting issues being taught was observed for "the need to provide references from webpages that you include in your schoolwork". This was reported as having been learnt by 22 per cent more Year 10 than Year 6 students. Additionally, Year 10 students were more likely to have learnt about changing their password for internet services (such as email) regularly than Year 6 students (a difference of 14 per cent).

Fewer than half of students at both year levels reported learning about checking the credentials of software patches before downloading and accepting (Year 6: 47 per cent; Year 10: 48 per cent) and using software to find and get rid of computer viruses (Year 6:

32 per cent; Year 10: 39 per cent). The proportion of "Yes" responses at both year levels in 2017 appears to correspond with the percentages from the 2014 cycle of the study, with only minor differences observed (not greater than 5 per cent over time).[1]

The 10 issues in this question were used to derive a scale on students' attribution of ICT learning to school.

Year 6 students who had attained the proficient standard reported having learnt significantly more about ICT issues at school than students who had not attained the proficient standard (see Table 6.4). A weak but significant correlation was found between the scale and achievement to further support this finding. However, the same association was not found for Year 10 students: no association between attribution to learning these tasks at school and ICT literacy performance was identified, and there was no significant differences observed in scale scores for those groups above and below the proficient standard for ICT literacy.

Table 6.4 Average scores on index of attributing ICT learning to school for students above and below the proficient standard overall and by gender

	Proficient standard	Overall		Male		Female	
Year 6	Above	50.8	(±0.6)	51.3	(±0.6)	50.4	(±0.8)
	Below	48.9	(±0.5)	49.1	(±0.7)	48.7	(±0.7)
	Difference	**1.9**	(±0.8)	**2.2**	(±0.9)	**1.7**	(±1.1)
	Correlation	**0.11**	(±0.0)	**0.12**	(±0.0)	**0.09**	(±0.1)
Year 10	Above	52.3	(±0.6)	52.6	(±0.8)	51.9	(±0.8)
	Below	52.5	(±0.7)	52.8	(±1.0)	52.2	(±1.0)
	Difference	-0.2	(±1.0)	-0.2	(±1.4)	-0.2	(±1.3)
	Correlation	0.00	(±0.0)	0.02	(±0.0)	-0.02	(±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

[1] A large increase over time was observed for the proportion of "Yes" responses to the item "Use software to find and get rid of computer viruses" (increases of 17 per cent and 13 per cent respectively); however, this is believed to be an artefact of the major changes made to the item, which previously asked whether students learnt about "keeping anti-virus software up to date" in the 2014 cycle.

Use of digital devices in class

Students reported how often 15 different activities related to the use of digital devices take place during their lessons ("Never", "Less than once a month", "At least once a month but not every week", and "At least once a week"; see Table 6.5).

Table 6.5 Frequency percentages of use of digital devices in classroom learning activities

	How often do the following activities take place in your lessons?	Never	Less than once a month	At least once a month but not every week	At least once a week
Year 6	My teacher uses digital devices to present information to the class.	6 (±0.8)	10 (±1.2)	17 (±1.5)	67 (±2.1)
	We use digital devices to present information to the class.	7 (±1.1)	23 (±1.9)	33 (±1.9)	37 (±2.4)
	My teacher uses digital devices to provide us feedback on our work.	27 (±2.4)	25 (±1.5)	24 (±1.7)	25 (±2.3)
	We use digital devices to collaborate with each other on projects.	28 (±2.4)	21 (±1.8)	27 (±1.7)	24 (±2.6)
	We use digital devices to collaborate with students from other schools on projects.	59 (±2.2)	15 (±1.2)	13 (±1.2)	13 (±1.3)
	We use digital devices to complete tests.	15 (±1.6)	33 (±1.9)	31 (±1.9)	21 (±1.8)
	We use digital devices to work on short assignments (i.e. within one week).	18 (±1.7)	24 (±1.7)	32 (±1.6)	26 (±2.0)
	We use digital devices to work on extended projects (i.e. projects that last longer than one week).	17 (±1.9)	25 (±2.0)	32 (±1.9)	27 (±2.4)
	We use the Internet to contact students from other schools about projects.	69 (±2.3)	12 (±1.1)	10 (±1.3)	9 (±1.3)
	We use the Internet to contact experts outside the school.	65 (±2.7)	16 (±1.9)	10 (±1.3)	8 (±1.2)
	We use digital devices to collect data for a project.	14 (±1.6)	22 (±1.9)	33 (±1.9)	32 (±2.3)
	We use digital devices to analyse data.	31 (±2.3)	26 (±1.7)	25 (±1.7)	18 (±1.6)
	We use digital devices to produce or edit audio.	45 (±2.3)	27 (±1.7)	16 (±1.7)	12 (±1.5)
	We create or edit visual products (e.g. animations, videos, 3D drawings).	44 (±2.3)	28 (±1.8)	18 (±1.7)	10 (±1.1)
	We create or program robotic devices.	56 (±3.2)	22 (±2.0)	13 (±1.4)	10 (±1.5)

Table 6.5 (continued)

	How often do the following activities take place in your lessons?	Never	Less than once a month	At least once a month but not every week	At least once a week
Year 10	My teacher uses digital devices to present information to the class.	4 (±0.9)	6 (±0.8)	14 (±1.1)	76 (±1.8)
	We use digital devices to present information to the class.	5 (±1.0)	16 (±1.4)	31 (±1.6)	48 (±2.0)
	My teacher uses digital devices to provide us feedback on our work.	11 (±1.4)	17 (±1.6)	31 (±1.7)	41 (±2.3)
	We use digital devices to collaborate with each other on projects.	11 (±1.3)	19 (±1.3)	30 (±1.5)	40 (±2.2)
	We use digital devices to collaborate with students from other schools on projects.	50 (±2.1)	13 (±1.2)	16 (±1.2)	21 (±1.9)
	We use digital devices to complete tests.	20 (±2.1)	34 (±2.2)	25 (±2.0)	21 (±1.6)
	We use digital devices to work on short assignments (i.e. within one week).	6 (±1.2)	15 (±1.3)	34 (±1.8)	45 (±2.1)
	We use digital devices to work on extended projects (i.e. projects that last longer than one week).	6 (±1.1)	15 (±1.5)	32 (±1.9)	47 (±2.3)
	We use the Internet to contact students from other schools about projects.	57 (±2.1)	13 (±1.1)	14 (±1.5)	15 (±1.5)
	We use the Internet to contact experts outside the school.	52 (±2.4)	20 (±1.4)	15 (±1.6)	14 (±1.5)
	We use digital devices to collect data for a project.	10 (±1.4)	16 (±1.3)	31 (±1.8)	43 (±2.4)
	We use digital devices to analyse data.	15 (±1.6)	21 (±1.4)	31 (±2.0)	34 (±2.2)
	We use digital devices to produce or edit audio.	34 (±2.2)	27 (±1.5)	21 (±1.5)	18 (±1.7)
	We create or edit visual products (e.g. animations, videos, 3D drawings).	42 (±2.1)	27 (±1.5)	16 (±1.3)	15 (±1.5)
	We create or program robotic devices.	66 (±2.5)	15 (±1.5)	10 (±1.3)	10 (±1.3)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

At both Year 6 and Year 10, the activity that students reported as taking place most frequently was their teachers using digital devices to present information to the class. This was reported as occurring at least once a month by 84 per cent of Year 6 students and 90 per cent of Year 10 students. Year 10 students also reported that they commonly used digital devices to present information to the class (79 per cent), to work on extended projects (79 per cent) and to work on short assignments (79 per cent).

Two scales were derived from the activities in this question. The first scale related to the use of digital devices in general classroom activities, and included the following items:

- My teacher uses digital devices to present information to the class.
- We use digital devices to present information to the class.
- My teacher uses digital devices to provide us feedback on our work.
- We use digital devices to collaborate with each other on projects.
- We use digital devices to work on short assignments (projects completed within one week).
- We use digital devices to work on extended projects (projects that last longer than one week).
- We use digital devices to collect data for a project.
- We use digital devices to analyse data.

The second scale related to the use of digital devices in specialised classroom activities, and included the following items:

- We use digital devices to collaborate with students from other schools on projects.
- We use the internet to contact students from other schools about projects.
- We use the internet to contact experts outside the school.
- We use digital devices to produce or edit audio.
- We create or edit visual products (for example, animations, videos, 3D drawings).
- We create or program robotic devices.

A significant, positive association was found between student ICT literacy achievement and the use of ICT for more general classroom activities (Table 6.6). Students who had attained the proficient standard reported using devices to undertake these activities significantly more often compared with students who had not attained the proficient standard. This finding was further reflected by weak but significant correlations observed between this index and ICT literacy achievement. The strength of the association appears stronger for Year 10 students compared with Year 6 students.

Table 6.6 Average scores on index of use of digital devices in classroom learning activities for students above and below the proficient standard overall and by gender

Use of digital devices in general classroom activities	Proficient standard	Overall		Males		Females	
Year 6	Above	51.3	(±0.8)	51.8	(±1.0)	50.8	(±0.8)
	Below	48.3	(±0.6)	48.6	(±0.8)	48.1	(±0.9)
	Difference	**2.9**	(±0.8)	**3.2**	(±1.3)	**2.6**	(±1.0)
	Correlation	**0.17**	(±0.0)	**0.19**	(±0.1)	**0.16**	(±0.1)
Year 10	Above	57.6	(±0.7)	57.5	(±1.0)	57.8	(±0.9)
	Below	53.3	(±0.8)	53.1	(±1.1)	53.6	(±1.0)
	Difference	**4.3**	(±1.1)	**4.3**	(±1.6)	**4.2**	(±1.3)
	Correlation	**0.23**	(±0.0)	**0.24**	(±0.1)	**0.21**	(±0.1)
Use of digital devices in specialised classroom activities	**Proficient standard**	**Overall**		**Males**		**Females**	
Year 6	Above	49.0	(±0.7)	49.6	(±0.8)	48.4	(±0.8)
	Below	51.5	(±0.8)	52.5	(±0.9)	50.4	(±1.1)
	Difference	**-2.5**	(±0.9)	**-2.9**	(±1.3)	**-2.0**	(±1.2)
	Correlation	**-0.16**	(±0.0)	**-0.19**	(±0.1)	**-0.12**	(±0.1)
Year 10	Above	50.7	(±0.6)	51.3	(±0.9)	50.0	(±0.7)
	Below	53.7	(±0.9)	54.5	(±1.1)	52.7	(±1.2)
	Difference	**-3.0**	(±1.0)	**-3.1**	(±1.4)	**-2.7**	(±1.4)
	Correlation	**-0.14**	(±0.0)	**-0.13**	(±0.1)	**-0.15**	(±0.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

*Statistically significant differences and statistically significant correlations are in **bold**.*

In contrast, the use of digital devices for more specialised classroom activities showed a significant, negative association with student ICT literacy achievement. Students performing at or above the proficient standard reported using devices significantly less frequently for these types of activities than students performing below the proficient standard (a difference of 3 scale points for both year levels). Similarly to the negative association reported between specialist applications and achievement, the types of activities undertaken for specialised classroom activities have less in common with the skills measured in the assessment than the more general activities (where a positive association with achievement was found).

Digital technologies–related classroom experience

The Australian Curriculum: Digital Technologies received ministerial endorsement in October 2015 for use across Australia from 2016. In response to this recent development, NAP–ICT Literacy 2017 included a new question (not included in previous cycles) asking students to report on the extent they have received instruction in their lessons on how to do a series of eight tasks that relate to the Australian Curriculum: Digital Technologies, with a specific focus on computational thinking ("To a large extent", "To a moderate extent", "To a small extent", "Not at all"; see Table 6.7). In addition to providing information about students' reported classroom experiences in 2017, data collected from this question provide a baseline against which students' reported experiences of Australian Curriculum: Digital Technologies classroom experiences may be compared.

Fewer than half of the students across both year levels reported receiving instruction "to a moderate extent" for the majority of the tasks. The exceptions to this were for the use of digital devices to present information to the class for all students (Year 6: 69 per cent; Year 10: 71 per cent) and for the creation of visual displays of information and processes (such as graphs, flow charts, and decision trees) for Year 10 students (52 per cent).

Table 6.7 Frequency percentages of instruction in digital technologies–related tasks

	In your lessons in the current school year, to what extent have you received instruction on how to do the following tasks?	To a large extent	To a moderate extent	To a small extent	Not at all
Year 6	Developing algorithms (e.g. instructions for a program like Scratch)	15 (±1.7)	23 (±2.1)	27 (±1.6)	35 (±2.5)
	Using digital devices to present information to the class	32 (±2.2)	37 (±1.9)	21 (±1.7)	10 (±1.2)
	Writing code, programs or macros	11 (±1.4)	23 (±1.6)	29 (±1.6)	38 (±2.5)
	Evaluating code programs or macros	9 (±1.3)	19 (±1.7)	27 (±1.8)	45 (±2.7)
	Developing applications	8 (±1.2)	18 (±1.5)	26 (±1.7)	48 (±2.2)
	Refining code to improve efficiency	9 (±1.3)	17 (±1.5)	24 (±1.5)	50 (±2.4)
	Debugging code	8 (±1.1)	14 (±1.4)	20 (±1.5)	58 (±2.5)
	Creating visual displays of information or processes (such as graphs, flow charts and decision trees)	19 (±1.7)	29 (±1.8)	26 (±1.5)	26 (±1.7)

Table 6.7 (continued)

	In your lessons in the current school year, to what extent have you received instruction on how to do the following tasks?	To a large extent	To a moderate extent	To a small extent	Not at all
Year 10	Developing algorithms (e.g. instructions for a program like Scratch)	7 (±1.1)	16 (±1.7)	20 (±1.5)	57 (±2.2)
	Using digital devices to present information to the class	34 (±2.2)	37 (±2.0)	19 (±1.6)	10 (±1.0)
	Writing code, programs or macros	7 (±1.1)	15 (±1.5)	20 (±1.6)	57 (±2.4)
	Evaluating code programs or macros	7 (±1.0)	14 (±1.4)	19 (±1.4)	60 (±2.1)
	Developing applications	6 (±1.0)	16 (±1.4)	23 (±1.6)	55 (±2.0)
	Refining code to improve efficiency	6 (±0.9)	13 (±1.3)	18 (±1.4)	63 (±2.2)
	Debugging code	6 (±1.0)	11 (±1.2)	17 (±1.3)	66 (±2.0)
	Creating visual displays of information or processes (such as graphs, flow charts and decision trees)	19 (±1.6)	33 (±1.8)	24 (±1.7)	23 (±1.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

Because results are rounded to the nearest whole number some totals may appear inconsistent.

The largest differences across the year levels were found for items on developing algorithms (for example, instructions for a program like Scratch) and writing code, programs or macros. The data suggest that instruction for this type of task is more prevalent for Year 6 students than for Year 10 students.

7

Curriculum connections

This chapter explores the results of the National Assessment Program – ICT Literacy (NAP–ICT Literacy) 2017 with a view to providing support to teachers and curriculum specialists about how the Australian Curriculum: ICT Capability (AC: ICT Capability) and the Australian Curriculum: Digital Technologies (AC: Digital Technologies) can be used to support teaching and learning of the knowledge, understanding and skills that underpin ICT literacy. This chapter has been written as a stand-alone support for educators but offers more context when it is viewed as part of the full report.

NAP–ICT Literacy and the Australian Curriculum

NAP–ICT Literacy assesses and reports what Australian students can do using ICT and how they use it in school and outside of school. The findings of the assessment give an indication of how Australia is progressing towards meeting the objectives set out in the 2008 Melbourne Declaration on Educational Goals for Young Australians.

Within the context of this National Assessment Program, ICT literacy is defined as a student's ability to use information technology to "access, manage, integrate and evaluate information, develop new understandings and communicate with others so they can participate effectively in society" (MCEETYA, 2005; ACARA, 2017).

NAP–ICT Literacy was first conducted in 2005, seven years before the publication of the AC: ICT Capability in 2012 and 10 years before ministerial endorsement of the AC: Digital Technologies in October 2015. As such, NAP–ICT Literacy is not a direct assessment of either the AC: ICT Capability or the AC: Digital Technologies subject. It does, however, assess and report on student achievement outcomes that are very closely associated with the AC: ICT Capability and has some overlap with the AC: Digital Technologies. Specific details of these relationships are provided in chapter 1.

The focus of this chapter is on how teaching of the AC: ICT Capability and AC: Digital Technologies can support students to develop ICT literacy as assessed, reported on and monitored by the National Assessment Program. In particular, the advice provided shows the strong relationship of and connection between:

- the Assessment Framework content, which underpins this assessment
- the AC: ICT Capability elements
- the AC: Digital Technologies strands.

Aims of the AC: ICT Capability

The implementation of the AC: ICT Capability supports students to learn to use ICT effectively and appropriately to access, create and communicate information and ideas, solve problems and work collaboratively, at school and in their lives beyond school. The capability involves students in learning to make the most of the digital technologies available to them. They adapt to new ways of doing things as technologies evolve and limit the risks to themselves and others in a digital environment.

The AC: ICT Capability asserts that "to participate in a knowledge-based economy and to be empowered within a technologically sophisticated society now and into the future, students need the knowledge, skills and confidence to make ICT work for them at school, at home, at work and in their communities. Information and communication technologies are fast and automated, interactive and multimodal, and they support the rapid communication and representation of knowledge to many audiences and its adaptation in different contexts" (ACARA, 2015).

The five elements for AC: ICT Capability are:

- applying social and ethical protocols and practices when using ICT
- investigating with ICT
- creating with ICT
- communicating with ICT
- managing and operating ICT.

While much explicit teaching of ICT can occur in the AC: Digital Technologies learning area, it is important to note that all learning areas from Foundation to Year 10 should provide the content and contexts within which students develop ICT literacy.

Aims of the AC: Digital Technologies

The aims of the AC: Digital Technologies are to develop knowledge, understanding and skills to ensure that, individually and collaboratively, students:

- design, create, manage and evaluate sustainable and innovative digital solutions to meet and redefine current and future needs
- use computational thinking and the key concepts of abstraction; data collection, representation and interpretation; specification, algorithms and implementation to create digital solutions
- confidently use digital systems to efficiently and effectively automate the transformation of data into information and to creatively communicate ideas in a range of settings
- apply protocols and legal practices that support safe, ethical and respectful communications and collaboration with known and unknown audiences

- apply systems thinking to monitor, analyse, predict and shape the interactions within and between information systems and the impact of these systems on individuals, societies, economies and environments (ACARA, 2015).

The content of the AC: Digital Technologies offers several opportunities in which students acquire skills and knowledge associated with ICT literacy. Creating digital solutions offers students a platform to learn new ICT skills and put them into practice in real-world situations.

In the following sections, selected findings of the NAP–ICT Literacy results are presented together with suggestions for how the AC: ICT Capability and AC: Digital Technologies may be used by systems, schools and teachers in planning their teaching and learning to support the development of student ICT literacy.

Trends and issues identified in 2017 NAP–ICT Literacy

Student performance in NAP–ICT Literacy 2017, as reported in detail in chapter 3, indicates the following:

- no significant difference in the performance of Year 6 and Year 10 students in 2017 in comparison to Year 6 and Year 10 students in 2014
- significant differences in performance between metropolitan students and those in rural and remote areas
- significant differences in performance based on gender in both year levels, with females performing significantly better than males
- significant differences in achievement between non-Indigenous students and Indigenous students across both Year 6 and Year 10.

Achievement of the proficient standard – Year 6

The key performance measure established for achievement in NAP–ICT Literacy for Year 6 is the proportion of students achieving at or above the proficient standard, which is the boundary between levels 2 and 3 on the NAP–ICT Literacy scale.

As reported in chapter 3, at the national level in 2017, 53 per cent of Year 6 students attained the proficient standard (see Table 3.11).

Teachers can support their students to develop their ICT literacy by Year 6 by identifying the content descriptions from all learning areas that provide opportunities to develop ICT literacy, and planning their teaching, learning and assessment accordingly. Valuing ICT literacy

in assessment is a powerful way to ensure students are progressively using ICT in more sophisticated ways. To provide sufficient time to develop these skills, both AC: ICT Capability across a range of learning areas, and AC: Digital Technologies should be taught from the Foundation year. Using evidence-based pedagogical strategies, such as providing students with effective feedback, can lead to continuity of skill development. For example, formative assessment on students would allow teachers to make adjustments and respond to student learning over a period of time. It should be noted that all content descriptions in AC: Digital Technologies reflect aspects of the AC: ICT Capability elements. The Australian Curriculum website has features that support the AC: ICT Capability. The AC: ICT Capability continua provide a guide for teachers when planning and teaching the AC: ICT Capability across all learning areas. It can be valuable when determining at what level a student is operating and planning next steps, or when developing rubrics for assessment tasks.

In addition, the Australian Curriculum website provides a filter function within each learning area. By selecting ICT Capability and filtering the content descriptions, those content descriptions that have been tagged for AC: ICT Capability will appear. The tagging indicates where there are opportunities for students to develop their ICT literacy. By clicking on the AC: ICT Capability symbol, educators can view the elements and sub-elements of the AC: ICT Capability that relate to that content description (an example is shown in Figure 7.1).

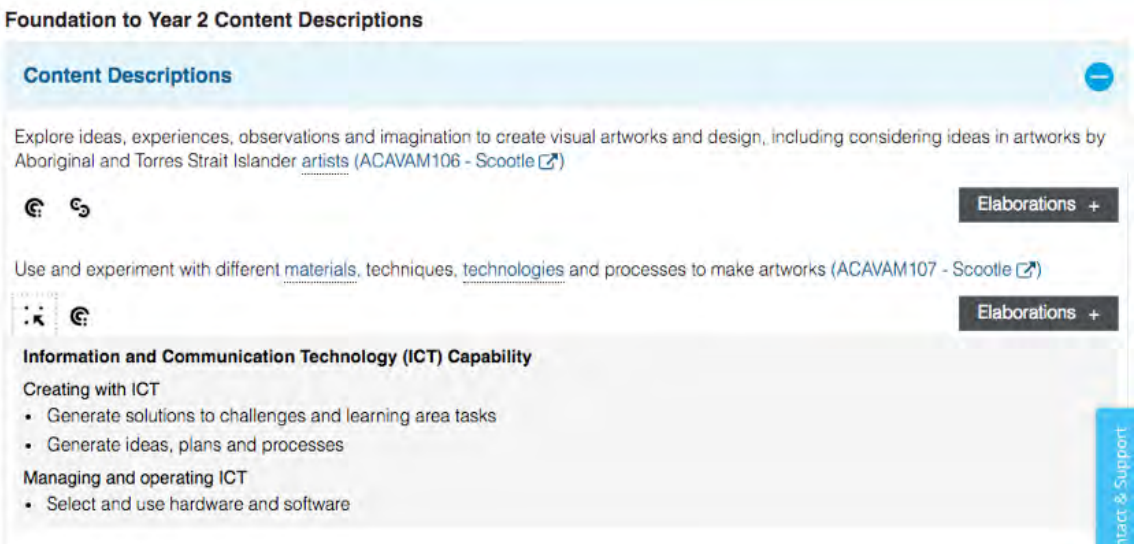


Figure 7.1 Relationship of Year 2 Visual Arts content descriptions to AC: ICT Capability elements

Based on the results of 2017, there is a need for Year 6 students to become more aware of the following processes in the NAP–ICT Literacy Assessment Framework:

- managing information (Managing and operating ICT)
- accessing and evaluating information (Investigating with ICT)
- developing new understandings (Creating ICT).

For example, students had difficulty managing file sizes, recognising common file features and creating solutions in the provided environments, such as a slideshow production.

The processes in the NAP–ICT Literacy Assessment Framework relate to the AC: ICT Capability and the AC: Digital Technologies (see chapter 1). In the AC: Digital Technologies advice below, connections are made to both the AC: ICT Capability element and the corresponding Assessment Framework concept.

Providing opportunities for students to have a more in-depth understanding of digital systems and the various ways they can be used may offer some support. For students working at level 2 on the NAP–ICT Literacy scale, for example, these opportunities can include:

- uploading and downloading files using a cloud-based platform
- using current and best practices for file management
- creating digital presentations with control over layout
- understanding digital systems and how projects can benefit from integrating different hardware and software.

Examples of what these opportunities may look like in practice can be found on the Australian Curriculum Work Samples page. An example of creating digital presentations with control over layout for Year 5 and 6 can be found at this link.

Teachers may consider exploring some of the following opportunities for enhancing AC: ICT Capability. The opportunities should be viewed as a way of improving current practice and learning opportunities for students. Teachers may see value in focusing on specific suggestions. These can be adjusted to ensure they are contextualised for different learning areas and are targeted at the appropriate level for students in a school.

Although all elements of the AC: ICT Capability are important and should be addressed in teaching and learning, based on the results as outlined in previous chapters and above, three AC: ICT Capability elements have been targeted for advice: Managing and operating ICT, Investigating with ICT, and Communicating with ICT. Focusing on these three elements may assist in moving students from lower achievement levels to higher achievement levels. As students undertake these activities, their enhanced skills will also be evident when engaged in the broader range of ICT elements such as Creating with ICT and Applying social and ethical protocols.

Foundation to Year 2

Across learning areas for Foundation to Year 2, examples of opportunities to enhance AC: ICT Capability are:

Managing and operating ICT
• Develop QWERTY keyboard awareness by learning the location of letters, how to make a capital and how to use punctuation. For example, using an old keyboard not connected to a computer, or a laminated keyboard where students can use a whiteboard marker to find the letters in their name.
• Use hyperlinks or QR codes to engage in the research process. Explore the importance of key search terms with teacher guidance.
• Use peripheral equipment in role play situations (for example, cameras). Alongside this use the language: input and output. Ask students to consider inputs and outputs for some devices.
Investigating with ICT
• Explore the use of the internet (opening a browser; using keys such as back, forward, home, close and refresh).
Communicating with ICT
• Open an email program, compose and send an email with support from the teacher.

Relevant content is also specified in the AC: Digital Technologies. Teachers may consider the following AC: Digital Technologies content descriptions and elaborations to enhance AC: ICT Capability:

Content descriptions	Elaborations
Recognise and explore digital systems (hardware and software) for a purpose (ACTDIK001)	Exploring and using digital systems for downloading and storing information; for example, knowing how to download images from a website and inserting them into a document, and saving and retrieving data **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002)	Making generalisations about data sets; for example, comparing different ways of travelling to school; discussing results and finding patterns **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing Information)**
Collect, explore and sort data, and use digital systems to present the data creatively (ACTDIP003)	Collecting, exploring and sorting data through play; for example, collecting data about favourite toys and sorting them into categories, such as toys they like or dislike **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Developing new understandings)**
Create and organise ideas and information using information systems independently and with others, and share these with known people in safe online environments (ACTDIP006)	Planning and creating text, drawings and sound files to share online; for example, jointly creating a photo story to illustrate a fable or fairy-tale from the Asia region or a local Aboriginal and Torres Strait Islander community story **AC: ICT Capability element: (Creating with ICT)** **NAP–ICTL Assessment Framework process: (Communicating)**

Years 3 and 4

Across learning areas for Years 3 and 4, examples of opportunities to enhance AC: ICT Capability are:

Managing and operating ICT
• Upload or share images through systems similar to airdrop.
• Create databases using cells, rows and columns.
• Explore terms such as a 'field', 'cell'.
• Identify the formulae bar within a spreadsheet.
• Upload images from a camera/device to a computer.
Investigating with ICT
• Explore the use of the internet; opening a browser; using keys such as back, forward, home, close and refresh.
Communicating with ICT
• Open an email program, compose and send an email with support from the teacher.
Applying social and ethical protocols and practices when using ICT
• Use simple examples of copyright laws and obligations.
• Examine online security, safety information, hacking and viruses.
Creating with ICT
• Insert graphics into a spreadsheet.

Teachers may consider the following AC: Digital Technologies content descriptions and elaborations to enhance AC: ICT Capability:

Content descriptions	Elaborations
Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)	Using different peripheral devices to display information to others; for example, using a mobile device, interactive whiteboard or a data projector to present information **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**
Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009)	Using different techniques to present data as information; for example creating a column chart in a spreadsheet by colouring cells to represent different items **AC: ICT Capability element: (Investigating with ICT)** **NAP–ICT Assessment Framework process: (Evaluating)**
Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)	Managing a project that involves students working together to publish online; for example, identifying how group members can help each other to avoid delays in finishing the project **AC: ICT Capability element: (Creating with ICT)** **NAP–ICT Assessment Framework process: (Developing new understandings)**

Years 5 and 6

Across learning areas for Years 5 and 6, examples of opportunities to enhance AC: ICT Capability are:

Managing and operating ICT
• Apply formulae to enhance the performance and function of spreadsheets.
• Sort data effectively and begin to interpret the data.
• Generate graphs using embedded formulae.
Investigating with ICT
• Use appropriate search terms and key words to broaden a narrow search.
Applying social and ethical protocols and practices when using ICT
• Use ethical protocols when publishing online.
• Examine online security, safety information, hacking and viruses.

Teachers may consider the following AC: Digital Technologies content descriptions and elaborations to enhance AC: ICT Capability:

Content descriptions	Elaborations
Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)	Describing digital systems as having internal and external components that perform different functions; for example, external components for inputting data including keyboard, microphone, stylus; external output components include speakers, projector and data storage **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**
Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)	Recognising the difference between numerical, text and date formats in spreadsheets **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing Information)**
Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017)	Describing in simple terms the nature of a problem and what a solution needs to achieve **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Developing new understandings)**
Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols (ACTDIP022)	Using a range of communication tools to share ideas and information; for example, participating in collaborative online environments **AC: ICT Capability element: (Creating with ICT)** **NAP–ICTL Assessment Framework process: (Communicating)**

Achievement of the proficient standard – Year 10

The key performance measure established for achievement in NAP–ICT Literacy for Year 10 is the proportion of students achieving at or above the proficient standard, which is the boundary between levels 3 and 4 on the NAP–ICT Literacy scale.

As reported in chapter 3, in 2017 at the national level, 54 per cent of Year 10 students attained the proficient standard (see Table 3.13).

Based on the results of 2017, there is a need for Year 10 students to become more aware of the following processes in the NAP–ICT Literacy Assessment Framework:

- managing information
- accessing and evaluating information and communicating
- communicating effectively through animation production
- managing file sizes and recognising common file features.

The processes in the NAP–ICT Literacy Assessment Framework relate to the AC: ICT Capability and AC: Digital Technologies (see chapter 1). In the AC: Digital Technologies advice below, connections are made to both the AC: ICT Capability element and the corresponding Assessment Framework process.

Year 10 students need to become more aware of working with information and creating and sharing information. Providing opportunities for students to have a more in-depth understanding of digital systems and the various ways they can use them may offer some support. These opportunities can include:

- uploading and downloading files using a cloud-based platform
- current and best practices for file management
- creating digital presentations with control over layout
- understanding design thinking and how digital projects can benefit from using such a process.

In Years 9 and 10, the AC: Digital Technologies subject is optional. Hence, it is particularly important that teachers in other learning areas continue to have high expectations of ICT capability and provide opportunities for students to apply what they have learnt across learning areas, specifically in Years 7 and 8 AC: Digital Technologies.

Teachers can support their students to develop their ICT literacy by Year 10 by identifying the content descriptions from all learning areas that provide opportunities to develop ICT literacy, and planning their teaching, learning and assessment accordingly. Valuing ICT literacy in assessment is a powerful way to ensure students are progressively using ICT in more sophisticated ways. It should be noted that all content descriptions in AC: Digital Technologies reflect aspects of the AC: ICT Capability elements.

The Australian Curriculum website has features that support AC: ICT Capability. The AC: ICT Capability continua provide a guide for teachers when planning and teaching for ICT literacy across all learning areas. It can be valuable when determining at what level a student is operating and planning next steps, or when developing rubrics for assessment tasks.

In addition, the Australian Curriculum website provides a filter function within each learning area. By selecting ICT Capability and filtering the content descriptions, those content descriptions that have been tagged for AC: ICT Capability will appear. The tagging indicates where there are opportunities for students to develop their ICT literacy. By clicking on the ICT Capability symbol, educators can view the elements and sub-elements of the AC: ICT Capability that relate to that content description (an example is shown in Figure 7.2).

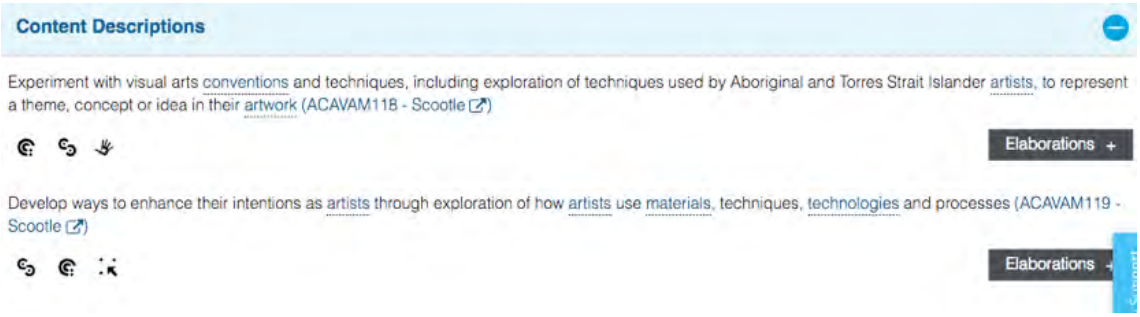


Figure 7.2 Relationship of Year 7 Visual Arts content descriptions to AC: ICT Capability elements

For Years 7 and 8, the AC: Digital Technologies achievement standard states that:

> students explain how social, ethical, technical and sustainability considerations influence the design of innovative and enterprising solutions to meet a range of present and future needs. They explain how the features of technologies influence design and production decisions. Students make choices between different types of networks for defined purposes.
>
> Students explain a range of needs, opportunities or problems and define them in terms of functional requirements and constraints. They collect, authenticate and interpret data from a range of sources to assist in making informed judgements. Students generate and document in digital and non-digital form, design ideas for different audiences using appropriate technical terms, and graphical representation techniques including algorithms. They independently and safely plan, design, test, modify and create a range of digital solutions that meet intended purposes including user interfaces and the use of a programming language. They plan, document and effectively manage processes and resources to produce designed solutions for each of the prescribed technologies contexts. They develop criteria for success, including innovation and sustainability considerations, and use these to

> judge the suitability of their ideas, solutions and processes. Students use appropriate protocols when collaborating, and creating and communicating ideas, information and solutions face-to-face and online.
>
> (ACARA, 2015)

Although all elements of the AC: ICT Capability are important and should be addressed in teaching and learning, based on the results as outlined in previous chapters and above, three AC: ICT Capability elements have been targeted for advice: Managing and operating ICT, Investigating with ICT, and Creating with ICT. Activities targeting these three elements can provide contexts for the development of the broader range of ICT elements such as Communicating with ICT and Applying social and ethical protocols.

Years 7 and 8

Across learning areas for Years 7 and 8, examples of opportunities to enhance ICT Capability:

Managing and operating ICT
• Explore different network systems for transmitting data, such as switches, hubs, bridges and mobile networks.
Investigating with ICT
• Use software such as spreadsheets to summarise data to create information; for example, calculating a simple budget of income and payments and creating a summary table for analysis.
• Understand website directories and creating search engine queries and learning how to use prefixes to gain more accurate results, such as intitle: or inurl:.
Creating with ICT
• Document and sequence tasks that need to be done in a project situation, establish what resources might be needed to collaboratively create solutions including organising the timeline, devising file name conventions and planning back-up measures.

Teachers may consider the following AC: Digital Technologies content descriptions and elaborations to enhance AC: ICT Capability:

Content descriptions	Elaborations
Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance (ACTDIK023)	Explaining how cellular radio towers (transceivers) and mobile phones work together to create mobile networks **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**
Acquire data from a range of sources and evaluate authenticity, accuracy and timelines (ACTDIP025)	Checking authenticity of data; for example, ensuring the source or author is a reliable individual or organisation **AC: ICT Capability element: (Applying social and ethical protocols and practices when using ICT)** **NAP–ICTL Assessment Framework process: (Using ICT appropriately)**
Analyse and visualise data using a range of software to create information, and use structured data to model objects or events (ACTDIP026)	Visualising data to create information; for example, identify trends and outlier data from spreadsheets using plots, or displaying geocoded data on a map **AC: ICT Capability element: (Investigating with ICT)** **NAP–ICTL Assessment Framework process: (Accessing and evaluating information)**
Plan and manage projects that create and communicate ideas and information collaboratively online, taking safety and social contexts into account (ACTDIP032)	Creating web-based information to meet specific needs; for example, modifying an existing website template or using web-authoring software, including using HTML and cascading style sheets (CSS) **AC: ICT Capability element: (Creating with ICT)** **NAP–ICTL Assessment Framework process: (Developing new understandings)**

Illustration of integrated teaching practice linking AC: ICT Capability elements and AC: Digital Technologies strands

ICT, when integrated into the classroom, adds immense value to the quality of teaching, making it a holistic learning experience for the students. It makes education student-centred, visual and time-saving, and motivates the students to be creative. When incorporated into the curriculum systematically, it helps teachers to make complicated concepts simple and easy to understand. It gives students an opportunity to become a part of the global technology village, enhancing their technical and communication skills.

Figure 7.3 represents how one teaching and learning idea could address aspects of all five elements of the AC: ICT Capability. This example can be used as an entire project idea or the tasks can be used individually as examples of purposeful activities to implement the AC: ICT Capability.

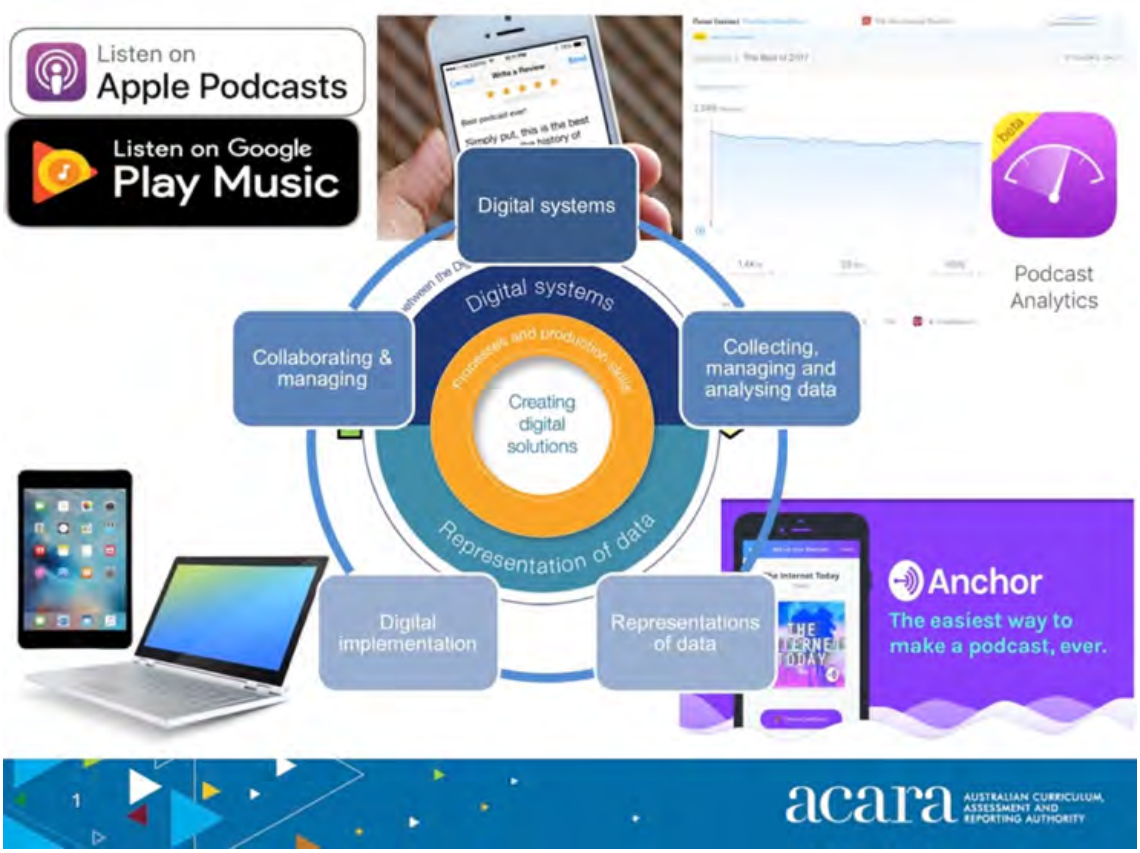


Figure 7.3 AC: Digital Technologies task and its relationship to AC: ICT Capability elements[1]

Students could create a podcast using elements of the AC: ICT Capability and demonstrating knowledge, understanding and skills of the AC: Digital Technologies. This activity could integrate with a range of learning areas. For example, a podcast by students in Year 8 could be developed to explain the processes in Science that occur on earth to form sedimentary, igneous and metamorphic rock while using Geographical inquiry skills to link that Science knowledge to the student's own region.

[1] Slide created by Dee Poole, Curriculum Officer, Digital Technologies in Focus, ACARA. Image sources: Podcast Analytics App https://www.imore.com/how-rate-or-review-podcast-your-iphone-or-ipad; iPad image https://upload.wikimedia.org/wikipedia/en/a/a8/IPad_Mini_4_ClearPhoto.jpg; Laptop image https://images.pexels.com/photos/538969/pexels-photo-538969.jpeg?cs=srgb&dl=computer-laptop-technology-538969.jpg&fm=jpg; Anchor images can be used from the Presskit.

An overview of content from different learning areas that could be covered by this example:

Content descriptions	AC: ICT Capability elements and NAP–ICT processes
English *Creating texts:* Use a range of software, including word processing programs, to create, edit and publish texts imaginatively (ACELY1738)	**AC: ICT Capability elements: (Creating with ICT, Managing and operating ICT, Communicating with ICT)** **NAP–CTL Assessment Framework processes: (Developing new understandings, Managing information, Communicating)**
Science *Earth and space sciences:* Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)	**AC: ICT Capability element: (Creating with ICT, Investigating with ICT, Communicating with ICT)** **NAP–ICTL Assessment Framework processes: (Developing new understandings, Accessing and evaluating information, Communicating)**
Geography *Geographical Inquiry skills:* Represent data in a range of appropriate forms; for example, climate graphs, compound column graphs, population pyramids, tables, field sketches and annotated diagrams, with and without the use of digital and spatial technologies (ACHGS057)	**AC: ICT Capability element: (Creating with ICT, Investigating with ICT, Managing and operating ICT)** **NAP–ICTL Assessment Framework processes: (Developing new understandings, Managing information)**
Digital Technologies *Processes and production skills*: Analyse and visualise data using a range of software to create information, and use structured data to model objects or events (ACTDIP026)	**AC: ICT Capability element: (Creating with ICT, Investigating with ICT, Managing and operating ICT, Applying ethical and social protocols and practices when using ICT)** **NAP–ICTL Assessment Framework processes: (Developing new understandings; Accessing and evaluating information, Managing information, Using ICT appropriately)**

The processes that students work through and the digital tools they use are key to ensuring effective integration. Teachers should ensure that students are provided with an opportunity to demonstrate their understanding of both the learning area content and the complexity required to integrate digital tools. By utilising applications to look at the data collected relative to their podcast, students are provided with some additional insight into their podcasts. For example, the types of devices that are being used to listen to the students' podcasts, how many listeners, and even what percentage of listeners are listening to the end.

Performance by gender – Year 6 and Year 10

Table 3.14 in chapter 3 indicates the percentage of males and females in Year 10 achieving proficiency in NAP–ICT Literacy from 2005 to 2017.

Across all cycles of NAP–ICT Literacy, female students have outperformed male students (see Tables 3.15 and 3.16 in chapter 3). In 2017, 56 per cent of Year 6 female students reached the proficient standard, compared to 51 per cent of male Year 6 students. For Year 10 students, the percentages were 58 and 51 respectively. The average scale scores of female students were higher than those of male students at both year levels (14 score points for Year 6 and 19 for Year 10).

Interestingly, these results contrast with female engagement in elective digital technologies subjects and in tertiary courses. Under-representation by females in secondary and tertiary digital technologies courses is surprising, given that a strong level of ICT literacy is essential for engaging effectively with digital technologies. Furthermore, while female students have greater ICT literacy, males show greater confidence to move into occupations with a higher demand for computing. According to the Australian Government's Workplace Gender Equality fact sheet, https://www.wgea.gov.au/sites/default/files/Gender%20composition-of-the-workforce-by-industry.pdf (April 2016), workforce composition by gender reported that women made up only 26 per cent of the full-time information media and telecommunications workforce and 11.6 per cent of the part-time workforce, whereas men comprised 53.5 per cent of the full-time workforce in the same industry and 8.9 per cent of the part-time workforce for this industry.

Teachers may consider the specific opportunities for males and/or females to positively engage in learning about and with digital technologies and ICT literacy within their own class, school or community context to address the gender gap.

Teachers may consider incorporating the following activities into teaching and learning programs:

- Explore gender stereotypes in technological contexts and the role and contribution of male and female designers and technologists.
- Provide effective role models at a school level with teachers who use ICT efficiently and productively to provide both male and female students with a benchmark for skill achievement.
- Ensure both males and females are contributing equally to all aspects of a project by developing rubrics that value ICT literacy skills.
- Effectively engage with the curriculum in all year levels to lead to the development of knowledge and understanding, and processes and production skills that can be demonstrated in NAP–ICT Literacy.
- Ensure that educational environments are fair to all students, male and female. Grouping of students, task expectations and providing the necessary time for students to grasp a concept are all important for successful engagement with digital technologies.

Performance by Indigenous status – Year 6 and Year 10

Table 3.17 in chapter 3 shows percentages of Indigenous and non-Indigenous students attaining the proficient standard in NAP–ICT Literacy 2017. At both year levels there were considerable differences in achievement between non-Indigenous and Indigenous students, with 55 per cent of non-Indigenous students attaining the proficient standard in comparison to 24 per cent of Indigenous students performing at or above the proficient standard for both Year 6 and Year 10.

The content descriptions and achievement standards of the Australian Curriculum, in particular AC: Digital Technologies, allow teachers to provide targeted relevant learning contexts for Indigenous students. For example, students might find it beneficial to engage with both local Indigenous community leaders and industry members. These connections may provide contexts for projects specific to learning areas that develop ICT literacy; for example, developing digital stories in History or in English with an Aboriginal and Torres Strait Islander perspective.

Teachers may consider incorporating the following activities into teaching and learning programs:

- Use the mgoals platform to set goals for living and learning, allowing students to interact with teachers, parents and mentors: http://mgoals.com.au/wp-content/uploads/sites/52/2016/08/mgoals-information.pdf.
- Introduce the Tech Savvy Elders program within the community. Students are encouraged to support elders to learn more about using multimedia technology to tell stories: http://mgoals.com.au/.
- Use the Narragunnawali Digital Technologies resource guide to support school and lesson planning: https://www.narragunnawali.org.au/curriculum-resources?subject=4.
- Engage in the Indigenous Digital Excellence program (IDX). This program tries to unlock the opportunities the digital world can provide Aboriginal and Torres Strait Islander peoples. Strengthening Indigenous participation, practice and entrepreneurship in the digital economy: http://idx.org.au/.

Performance by geographic location – Year 6 and Year 10

Table 3.23 in chapter 3 shows percentages of students achieving the proficient standard by geographic location in NAP–ICT Literacy 2017.

At both year levels, students in metropolitan schools demonstrated higher ICT literacy than students in regional and remote schools (see Tables 3.23 and 3.24). Students in the metropolitan areas have significantly higher average test scores than students from remote areas. For Year 6, 58 per cent of metropolitan students, but only 35 per cent of students in remote areas, achieved the proficient standard. The results for Year 10 were similar, with 57 per cent of students in metropolitan areas achieving the proficient standard versus 31 per cent of students in remote areas.

There are unique challenges for developing ICT literacy in regional, rural and remote communities. Teachers in these areas of Australia might find it useful to frame ICT literacy activities relating to information sourcing and communication around locally relevant issues and make use of the communication and collaboration opportunities that digital technologies can offer to connect students in rural and remote locations with others. Positively engaging in digital technologies with local industry members and the broader community will demonstrate to students that effective use of ICT and digital technologies is closely linked to regional and industry development. This highlights a key idea of the AC: Digital Technologies – to offer students opportunities to create solutions for preferred futures.

Teachers may consider incorporating the following activities into teaching and learning programs:

- Use unplugged activities to learn new concepts, such as creating logic circuits from dominoes, sorting networks, and using a card trick to explain the concept of parity: www.csunplugged.com. For example, use large flash cards with database query criteria on them (such as eyes = blue, name = J*), place them around the room and have the students move depending on whether their personal characteristics meet the criteria.
- Connect with members of local industry, such as registering with the 'STEM Professionals in Schools' program through CSIRO: https://www.csiro.au/en/Education/Programs/STEM-Professionals-in-Schools.
- Use approved cloud-based platforms according to jurisdiction regulations.
- Use the Narragunnawali Digital Technologies resource guide: https://www.narragunnawali.org.au/curriculum-resources?subject=4.
- Develop student enterprise skills with a focus on effective use of ICT.

NAP–ICT Literacy scale: exemplar items and student responses

This section enables teachers to see both sample questions and responses from students that are representative of the NAP–ICT Literacy achievement scale. This scale is referred to in more detail in chapter 3. Teachers may find the exemplars and the suggested strategies and methodologies useful when considering their approaches to teaching ICT literacy.

The achievement of students in Year 6 and Year 10 is measured against the NAP–ICT Literacy scale, which has six achievement levels.

The scale represents increasing levels of knowledge, skills and understanding across all strands of the Assessment Framework. This Assessment Framework is closely aligned to the AC: ICT Capability and there is overlap with the AC: Digital Technologies. By providing opportunities for students to use ICT across learning areas and to use and apply the content of the AC: Digital Technologies, students' ICT literacy should improve.

The scale is developmental in the sense that students are assumed to be typically able to demonstrate achievement of the content described in the scale below as well as at their measured level of achievement.

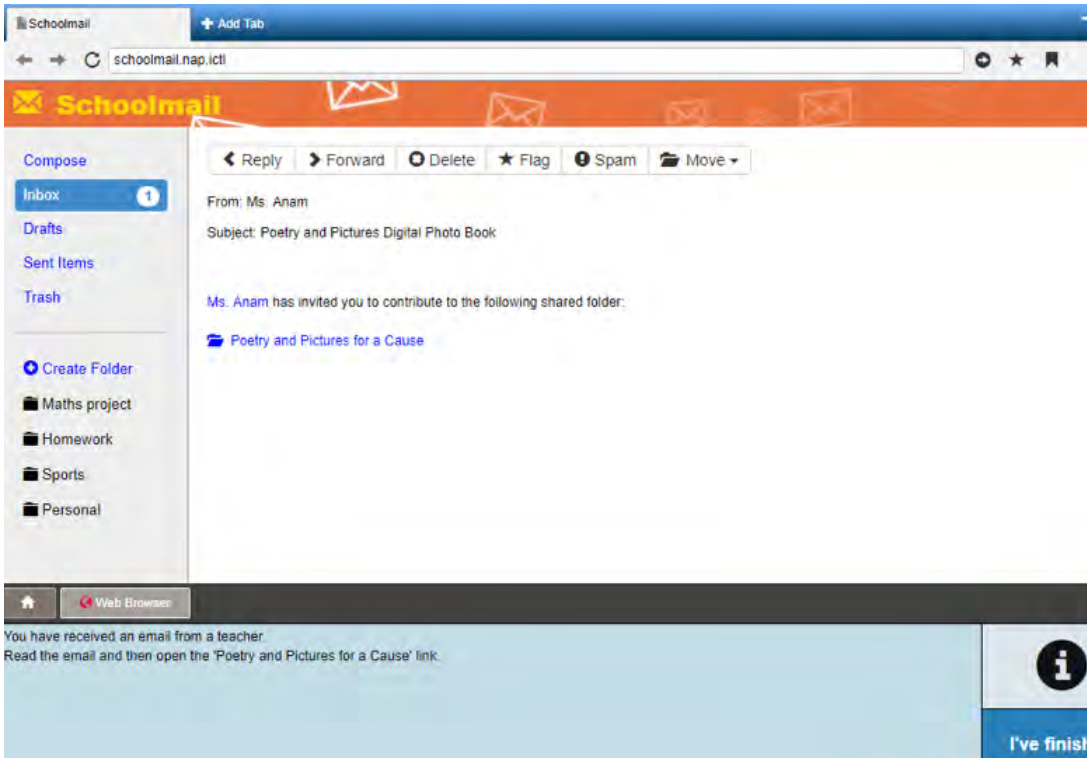
Summary indicators of each achievement level are provided below, together with a range of exemplar items to illustrate performance at each level. Each exemplar item from the 2017 NAP–ICT Literacy assessment is presented together with the percentage of students nationally (Year 6 and/or Year 10, as appropriate) who answered the item correctly. In addition, these items are presented with references to the NAP–ICT Literacy Assessment Framework (one strand and one process per item), for which the items were developed to assess. Also included are indicative references to the AC: ICT Capability including one knowledge and one skills reference per item and, where relevant, references to the AC: Digital Technologies.

The items are presented as screen shots from the 2017 NAP–ICT Literacy online tests themselves. The student samples provide indicative examples of students' answers in each of the NAP–ICT Literacy achievement levels. With the close alignment between the Assessment Framework, AC: Digital Technologies and ICT Capability, teachers, schools and systems may find it useful to use these items to support the development of students' ICT literacy in Year 6 and Year 10. By implementing some of the curriculum advice, teachers should begin to see an increase in ICT literacy.

It should be noted that each student's response is reproduced verbatim and should be viewed according to its demonstration of ICT literacy (and with reference to the AC: ICT Capability and AC: Digital Technologies indicators) rather than spelling, grammar or punctuation. The large response questions were marked on multiple criteria; for this review, example items 4, 5 and 6 demonstrate the student's response as a finished artefact.

ICT scale: level 1

Exemplar item 1 is at level 1 and is shown in Figure 7.4. The item required a one-click response and level 1 of this item was achieved by 87 per cent of Year 6 students and 92 per cent of Year 10 students. Students were required to click on a hyperlink within an email to demonstrate their understanding of ICT systems and that they can find information and data through a variety of processes. This was an example of a basic information task that required students to apply their knowledge of the display and functionality conventions used across web applications. To complete the task, students needed to be aware of the convention for anchor text and links to be displayed using alternative (blue) fonts to the body text and furthermore to recognise the convention for an icon (the folder) to be displayed as an indication of the relationship of the link to an external web application (My Drive that is referenced in other tasks within the module). Successful completion of this task was indicative of students' capacity to navigate web applications.



Per cent correct	
Year 6	Year 10
87	92

NAP–ICT Literacy Assessment Framework reference	
Strand	Working with information
Process	Knowing how to find information
Australian Curriculum: Digital Technologies indicative reference	
Knowledge	Years 5 and 6 – ACTDIK014: Examine the main components of common digital systems and how they may connect together to form networks to transmit data Years 7 and 8 – ACTDIK023: Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance
Skills	Years 5 and 6 – ACTDIP016: Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information Years 7 and 8 – ACTDIP025: Acquire data from a range of sources and evaluate authenticity and timeliness
Australian Curriculum: ICT Capability reference	
Element	Managing and operating ICT (Understand ICT systems)

Figure 7.4 Exemplar item 1

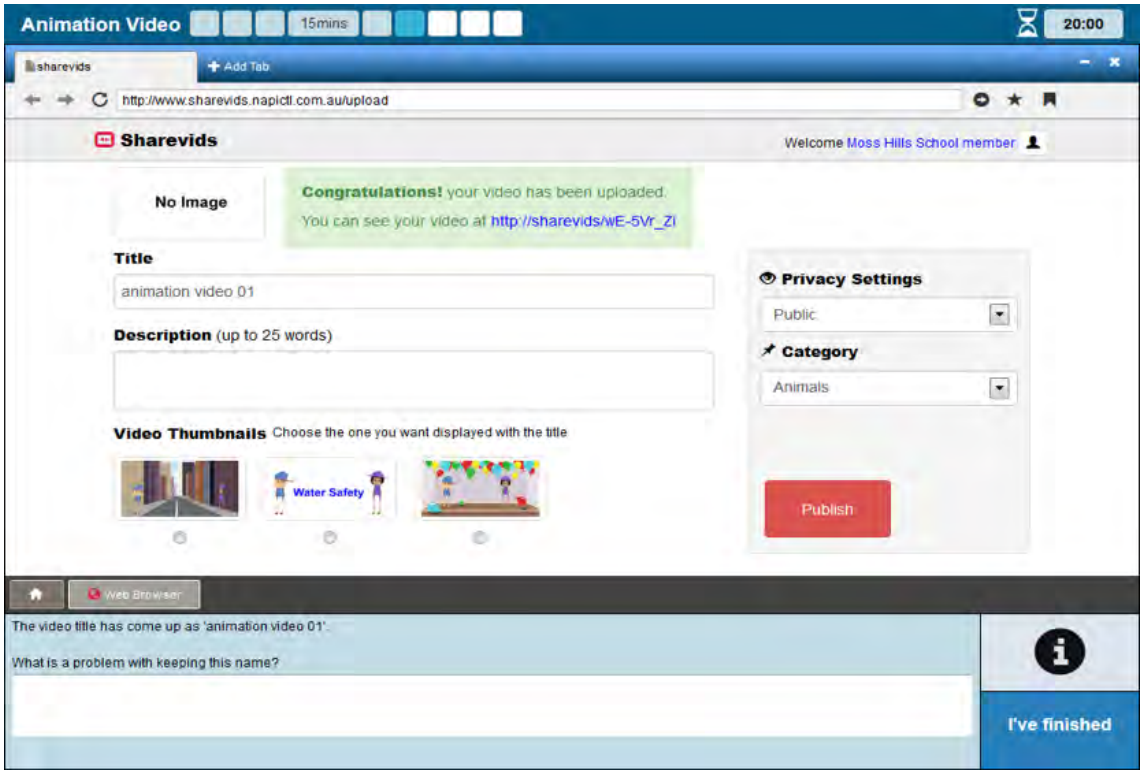
To gain full credit for this item, students had to visually recognise what a hyperlink looks like within a text space and click on the relevant link. This is evidence of a student completing a basic task by recognising and applying commonly used ICT terminology and functions.

In supporting students in the development and extension of the knowledge, understanding and skills assessed in this item, teachers might consider using one or more of the following activities, which reflect the elaborations from the Foundation to Year 8 AC: Digital Technologies:

- Experiment with different types of digital system components to perform input, output and storage functions; for example, use a mouse and keyboard to click on links and follow file paths.
- Explore and use digital systems for downloading and storing information; for example, click on a link to move to a website.
- Acquire data from a range of sources; for example, websites, books, mobile phones.
- Investigate how internal and external components of digital systems are coordinated to handle data; for example, what is the difference between wired systems and wireless systems? How is the data transferred?

ICT scale: level 2

Exemplar item 2 is at level 2 and is shown in Figure 7.5. Students were required to explain why a file name should be changed. This was an example of a basic reflection task that required students to apply their knowledge of ICT solutions used to manage digital data. In order to complete the task, students needed to demonstrate their understanding of the functionality of ICT solutions, the limitations they pose and how networked systems function. Understanding the appropriate conventions for file names and what the user experience is when searching for content was an important element. Successful completion of this task was indicative of students' capacity to understand the design and construct of file management.



Per cent correct	
Year 6	Year 10
56	76

NAP–ICT Literacy Assessment Framework reference	
Strand	Working with information
Process	Reflecting on the processes used to design and construct ICT solutions
Australian Curriculum: Digital Technologies indicative reference	
Knowledge	Years 5 and 6 – ACTDIK014: Examine the main components of common digital systems and how they may connect together to form networks to transmit data Years 7 and 8 – ACTDIK024: Investigate how digital systems represent text, image and audio data in binary
Skills	Years 5 and 6 – ACTDIP016: Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information Years 7 and 8 – ACTDIP025: Acquire data from a range of sources and evaluate authenticity and timeliness
Australian Curriculum: ICT Capability reference	
Element	Managing and operating ICT (Manage digital data)

Figure 7.5 Exemplar item 2

Exemplar item 2 is a constructed response item and level 2 on this item was achieved by 56 per cent of Year 6 students and 76 per cent of Year 10 students. To gain full credit for this item, students had to justify what the problem would be if the file name remained the same. They edited information products to show consistency of design and information management. Full credit was received if the student could discuss reasons such as lack of specificity about the content of the video, decreased discoverability on the Sharevids website or lack of persuasive tone.

Sample answers receiving full credit for this item are shown in Figure 7.6.

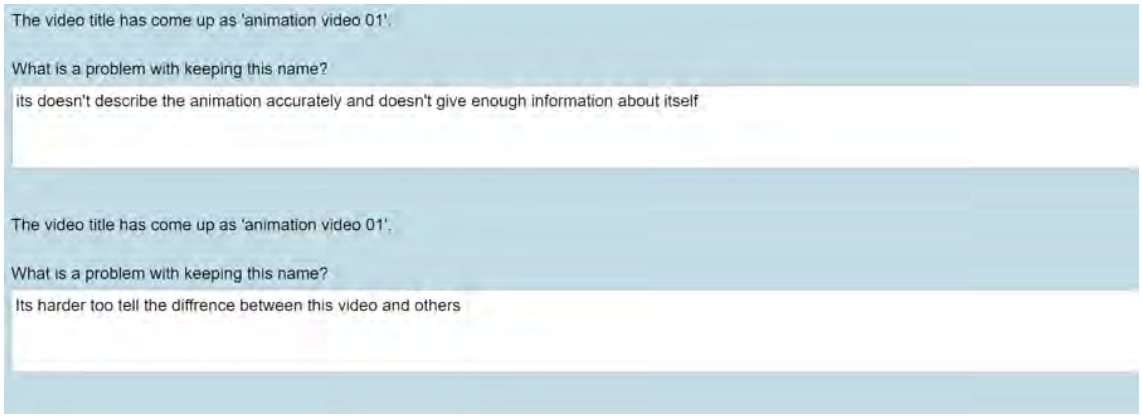


Figure 7.6 Sample level 2 answers to exemplar item 2

These level 2 responses have ensured they concisely answered the posed question. Responses not acquiring full credit to this item displayed limited information, vague or irrelevant responses, such as “It has numbers in it” and “It is too long”.

In supporting students in the development and extension of the knowledge, understanding and skills assessed in this item, teachers might consider using one or more of the following activities, which reflect the elaborations from the Foundation to Year 8 AC: Digital Technologies:

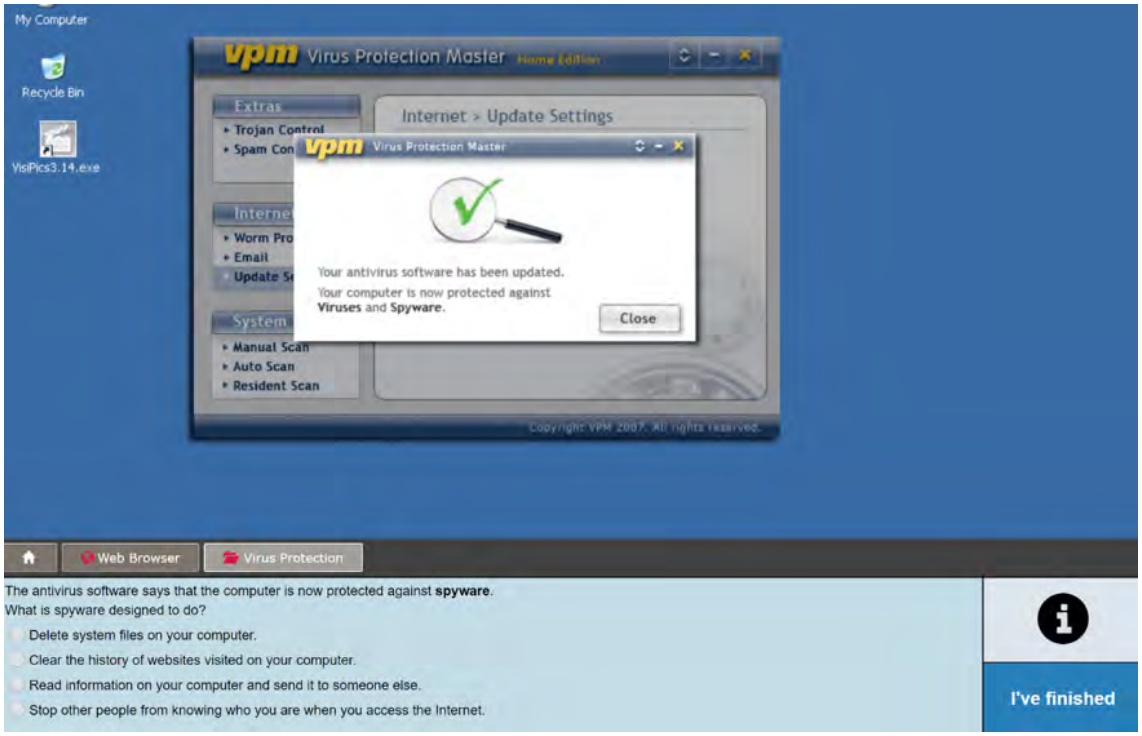
- Share and describe ways that common information systems can be used to meet communication needs; for example, computers can be used as phones and social networking tools allowing communication between families living in different regions.
- Recognise that images and music can be transferred from a mobile device to a computer; for example, use a cable to connect a camera and computer to upload images for a photo story.
- Describe digital systems as having internal and external components that perform different functions; for example, external components for inputting data including keyboard, microphone, stylus; internal processing components including the central processing unit; external output components including speakers, projector, screen; and data and information storage components including cloud and external devices.

- Explain ways media elements are presented; for example, the difference between embedded and linked media elements.
- Acquire data from a range of sources; for example, people, websites, books, mobile phones, radiofrequency identification (RFID) and data repositories such as the Australian Bureau of Meteorology (BOM), and compile this data into a digital format.
- Acquire data from online sources by narrowing the focus; for example, filter data using provided options or perform queries using advanced search functions.
- Recognise that all types of data are stored in digital systems and may be represented in different ways, such as files and folders with names and icons.
- Organise the instructions and files in readiness for implementation of a solution; for example, apply a file naming convention to all data files that are going to be used to create solutions.

ICT scale: level 3

Exemplar item 3 is at level 3 and is shown in Figure 7.7.

Thirty-seven per cent of Year 6 students and 56 per cent of Year 10 students correctly responded to this item. Students were required to recognise the purpose of spyware and be able to recognise the importance of applying digital information security practices. This was an example of recognising a common occurrence of ICT misuse, which is a characteristic of achievement at level 3. This example was reflective of a basic recognition task that required students to apply their knowledge of digital systems and an understanding of social, legal and ethical issues. In order to complete the task, students were required to recognise the purpose of spyware and be able to recognise the importance of applying digital information security practices. Successful completion of this task was indicative of best practice for ICT security and protocols.



Per cent correct	
Year 6	Year 10
37	56

NAP–ICT Literacy Assessment Framework reference	
Strand	Using ICT information responsibly
Process	Using ICT responsibly by considering social, legal and ethical issues
Australian Curriculum: Digital Technologies indicative reference	
Knowledge	Years 5 and 6 – ACTDIK014: Examine the main components of common digital systems and how they may connect together to form networks to transmit data Years 7 and 8 – ACTDIK023: Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance
Skills	Years 5 and 6 – ACTDIP022: Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols Year 7 and 8 – ACTDIP031: Evaluate how student solutions and existing information systems meet needs, are innovative, and take account of future risks and sustainability
Australian Curriculum: ICT Capability reference	
Element	Applying social and ethical protocols and practices when using ICT (Apply digital information security practices

Figure 7.7 Exemplar item 3

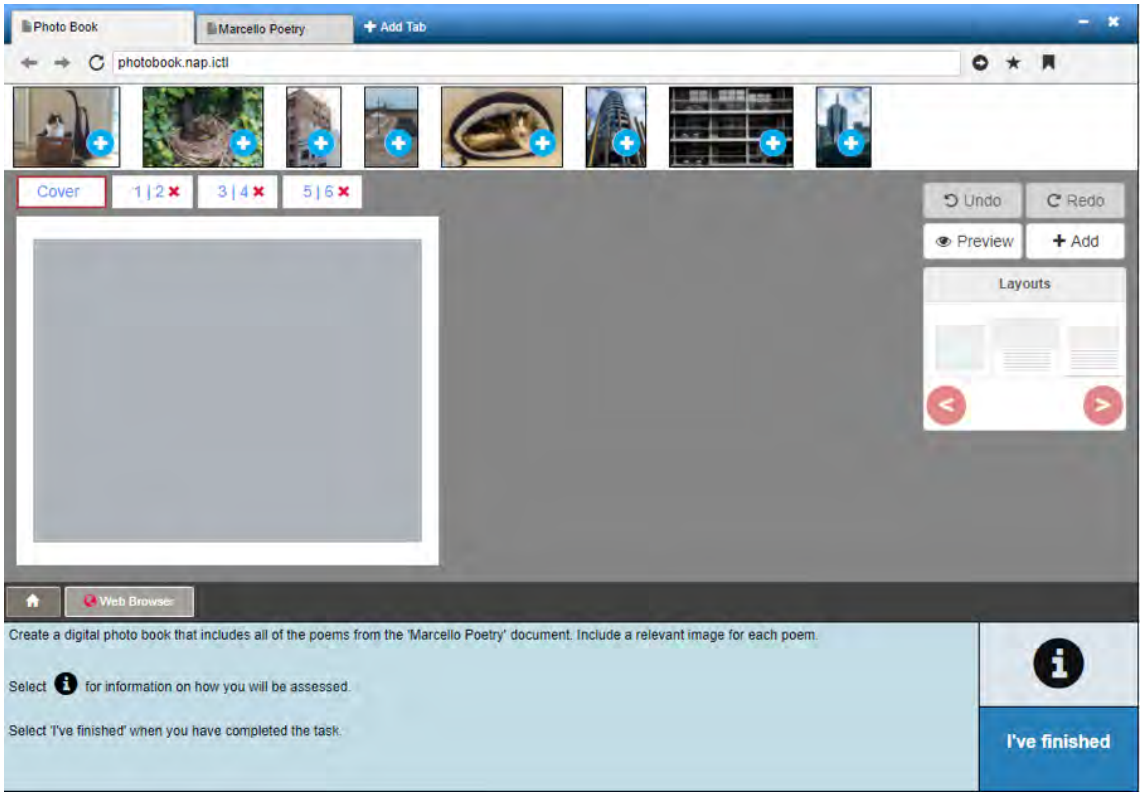
To gain full credit for this item, students had to choose the correct answer to explain what spyware is designed to do. They recognised common examples of best practice for ICT security and protocols, which can prevent misuse.

In supporting students in the development and extension of the knowledge, understanding and skills associated with this item, teachers might consider using one or more of the following activities, which reflect the elaborations from the Foundation to Year 8 AC: Digital Technologies:

- Make ethical decisions when using images for public viewing and using the work of others; for example, ask the question "What is fair and just?" to compare images of events or activities and deciding whether to publish.
- Participate in safe online environments; for example, share ideas and information through intranets, message only people they know, bookmark websites and use moderated online spaces.
- Discuss digital citizenship rules and behaviours for participating in an online environment; for example, not using all capital letters when expressing a strong viewpoint about a contentious matter and ensure that the students understand how and when to use a pseudonym to ensure safety.
- Make ethical decisions when faced with reporting inappropriate online behaviour or acknowledging digital products created by others; for example, make a decision based on how individuals would like to be treated by others.
- Apply practices that support the organisation of collaborative problem-solving; for example, find online meeting times that suit all members, and agree on ways of protecting files and sharing information digitally with members.
- Apply safe practices while participating in online environments; for example, check the default privacy settings and location settings to ensure maximum protection of personal details, and be aware of online filtering techniques and policies used at school and at home.
- Consider ways of managing the use of social media to maintain privacy needs; for example, activate privacy settings to avoid divulging personal data, such as photographs, addresses and names.
- Establish a set of "rules" about acceptable and unacceptable behaviour when collaborating online, considering how different social contexts affect participation in global virtual spaces, including considering the use of language, acronyms and humour; for example, only apply tags to images of other people with their permission or considering social protocols of Aboriginal and Torres Strait Islander Peoples.

ICT scale: level 4

Exemplar item 4 (Figure 7.8) shows the large task from the Poetry and Pictures test module (see chapter 2 for further details of the test modules). Student responses to this task were assessed using five criteria (four criteria had a maximum of two score points and one criterion had a maximum of one score point). This was an example of a task that required students to apply their knowledge of the display and functionality conventions used across digital applications. To complete the task, students needed to be aware of the conventions for inserting images and text, consistent layouts and accuracy of information. Successful completion of this task was indicative of students' capacity to navigate content between source documents and applications.



Per cent correct	
Year 6	Year 10
10	32

NAP–ICT Literacy Assessment Framework reference	
Strand	Creating and sharing information
Process	Retrieving information
Australian Curriculum: Digital Technologies indicative reference	
Knowledge	Years 5 and 6 – ACTDIK014: Examine the main components of common digital systems and how they may connect together to form networks to transmit data Years 7 and 8 – ACTDIK023: Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance
Skills	Years 5 and 6 – ACTDIP016: Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information Years 7 and 8 – ACTDIP025: Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness
Australian Curriculum: ICT Capability reference	
Element	Creating with ICT (Generate solutions to challenges and learning area tasks)

Figure 7.8 Exemplar item 4

To gain full credit for this item, students were required to undertake multiple steps within the task, such as: transfer all of the specified text content from a source document to a digital photo book; format images appropriately for a page spread in a digital photo book; transfer some of the specified text content from a source document to a digital photo book; and create text elements that are appropriately sized and positioned for most page layouts in a digital photo book.

Students who demonstrated all elements of the task, such as manipulating images and text size and image alignment and placement on slides, choosing appropriate images and adjusting text colour, gained full credit for this item. They created information products with simple linear structures and used software commands to edit and reformat the information product. Elements such as text not being contained inside a text box were considered acceptable since it is a limitation of the software and not a decision by the student.

A breakdown of the multiple criteria and the percentage of achievement for each step in Year 6 and Year 10 can be seen below:

Descriptor	Y6	Y10
Transfers all of the specified text content from a source document to a digital photo book (Code 2 Max 2)	**10%**	**32%**
Formats images appropriately for a page spread in a digital photo book (Code 1 Max 1)	**20%**	**46%**
Transfers some of the specified text content from a source document to a digital photo book (Code 1 Max 2)	**23%**	**58%**
Creates text elements which are appropriately sized and positioned for most page layouts in a digital photo book (Code 1 Max 2)	**34%**	**65%**

An example of a short response required students to copy and paste a URL into an email message. Full credit for this particular task was gained by 14 per cent of Year 6 students and 24 per cent of Year 10 students.

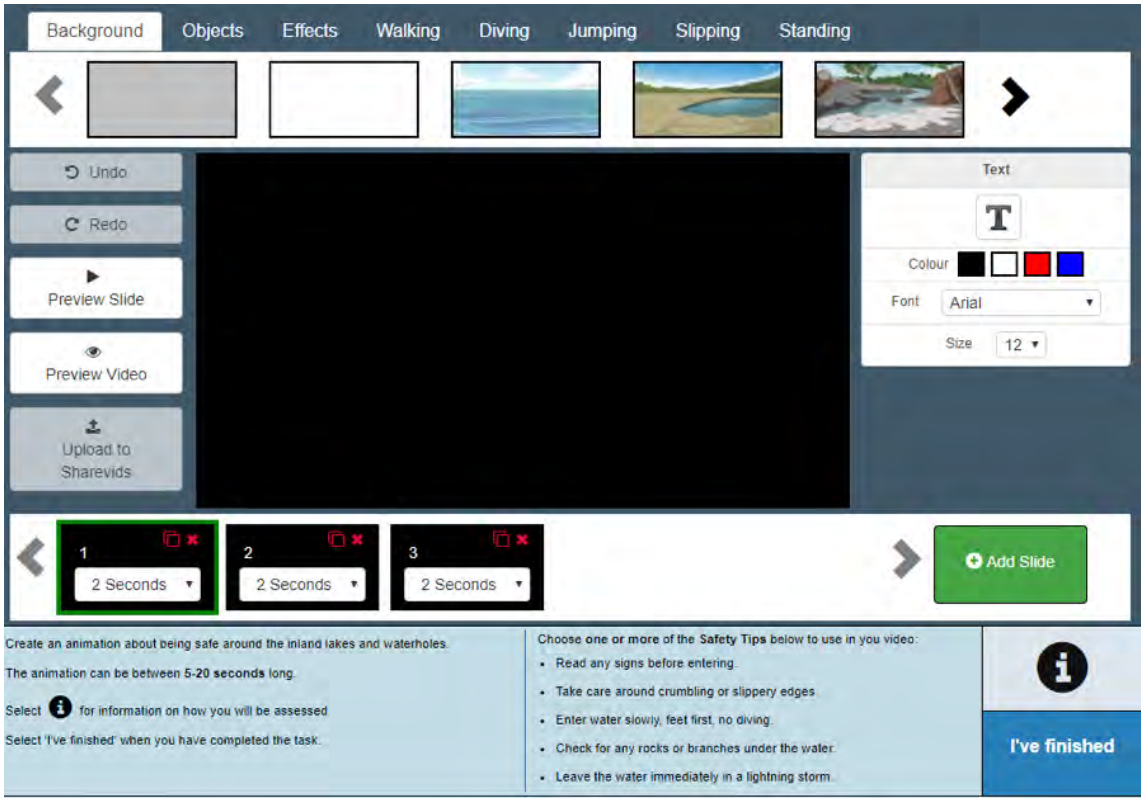
In supporting students in the development and extension of the knowledge, understanding and skills associated with this item, teachers might consider using one or more of the following activities, which reflect the elaborations from the Foundation to Year 8 AC: Digital Technologies:

- Use different types of data to create information for sharing in a safe community; for example, creating a multimedia class profile that includes a photo of each student, a personal audio recording and a written message.
- Understand the shortcut keys on a keyboard for tasks, such as copy and paste and cut and paste. Also explore how the left-click and right-click on a mouse work and compare these functions to a trackpad.
- Plan and create text, drawings and sound files to share online; for example, jointly create a photo story to illustrate a fable or fairy-tale from the Asia region or a local Aboriginal and Torres Strait Islander community story.

- Use a range of online tools to share information and be aware that information may be received at different times; for example, adding entries to a class blog, participating in a web conference or online chat with an author, or participating in a forum on a specific topic.
- Organise and create different types of information for sharing and collaborating online; for example, plan the sequence and appearance of an animation, and share it online with students from another school.
- Imagine how the functioning of one type of information system could be applied in a new way to meet a community or national need; for example, consider how an electronic tracking system such as a global positioning system (GPS) could be used to find people who are lost.
- Use digital systems to create web-based information, taking into consideration referencing conventions; for example, creating a blog, website or online learning space for sharing ideas.
- Use a range of communication tools to share ideas and information; for example, participate in collaborative online environments.
- Check authenticity of data; for example, ensure the source or author is a reliable individual or organisation.
- Compare the reliability and speed of transmitting data through wireless, wired and mobile networks.
- Investigate how the internal and external components of digital systems are coordinated to handle data; for example, how a keyboard, central processing unit and screen work together to accept, manipulate and present data and information.

ICT scale: level 5

Exemplar item 5 (Figure 7.9) shows the large task from the Animation Video test module (see chapter 2 for further details of the test modules). Student responses to this task were assessed using four criteria (two criteria had a maximum of two score points and two had a maximum of one score point). This was an example of a task that required students to apply their knowledge of digital systems and the communication conventions used across animation applications. To complete the task, students needed to be aware of the conventions for telling stories through a digital lens and the importance of user experience with applications, such as font and image choice. Successful completion of this task was indicative of students' capacity to create a short animation with effective execution of continuity and time.



Per cent correct	
Year 6	Year 10
7	16

NAP–ICT Literacy Assessment Framework reference	
Strand	Creating and sharing information
Process	Creating information products to suit the audience, the context and the medium
Australian Curriculum: Digital Technologies indicative reference	
Knowledge	Years 5 and 6 – N/A Years 7 and 8 – N/A
Skills	Years 5 and 6 – ACTDIP022: Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols Years 7 and 8 – ACTDIP031: Evaluate how student solutions and existing information systems meet needs, are innovative, and take account of future risks and sustainability
Australian Curriculum: ICT Capability reference	
Element	Creating with ICT (Generate ideas, plans and processes)

Figure 7.9 Exemplar item 5

To gain full credit for this item, students were required to undertake multiple steps, such as: create a short animation with effective execution of continuity and time that enhances the content; select and use a variety of image types throughout the animation in a coherent way that enhances "watch-ability" and purpose; and create text elements that are appropriately sized and positioned for an effective user experience.

Students who demonstrated all elements of the task gained full credit for this item. They used software features to present information consistent with presentation conventions. A breakdown of the multiple criteria and the percentage of achievement for each step in Year 6 and Year 10 can be seen below:

Descriptor	Y6	Y10
Creates a short animation with effective execution of continuity and time that enhances the content (Code 2 Max 2)	**7%**	**16%**
Selects and uses a variety of image types throughout the animation in a coherent way that enhances 'watch-ability' and purpose (Code 2 Max 2)	**10%**	**23%**
Creates text elements which are appropriately sized and positioned for all page layouts in a digital photo book (Code 2 Max 2)	**9%**	**17%**
Creates text elements which are appropriately sized and positioned for most page layouts in a digital photo book (Code 1 Max 2)	**34%**	**65%**

An example of a short response required students to identify a hyperlink for a webpage content manager. Full credit for this particular task was gained by 15 per cent of Year 6 students and 35 per cent of Year 10 students.

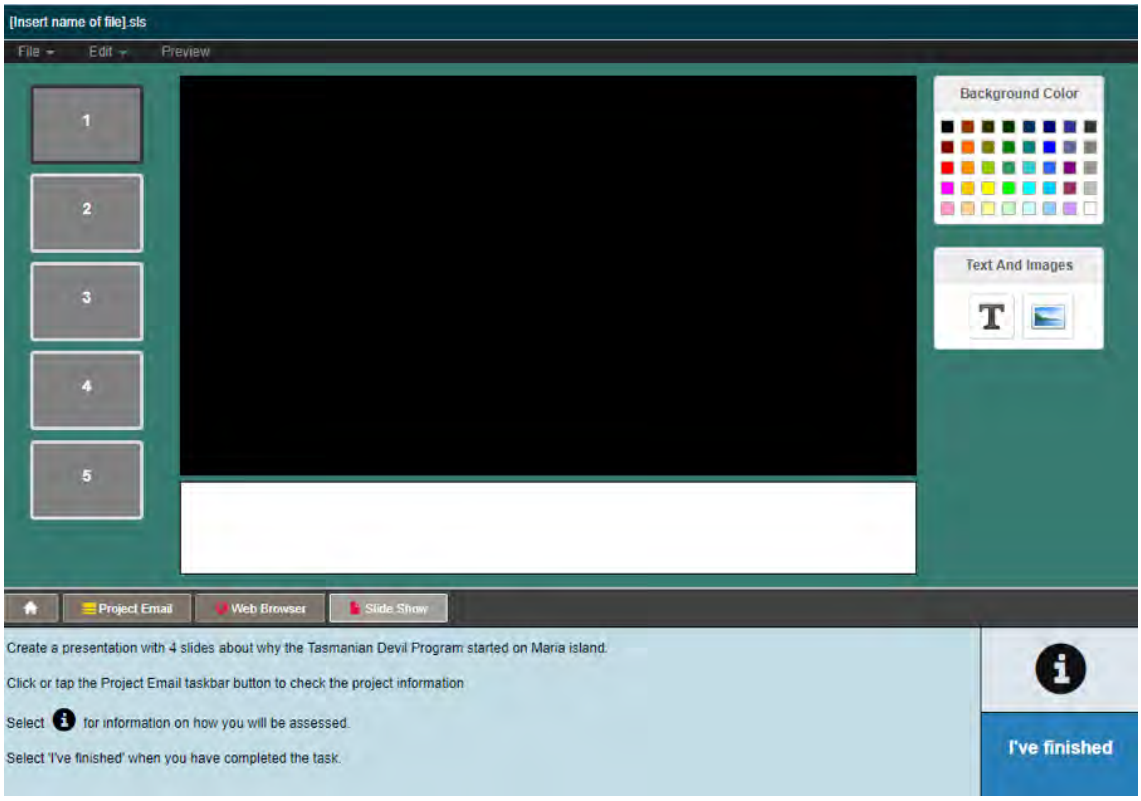
In supporting students in the development and extension of the knowledge, understanding and skills associated with this item, teachers might consider using one or more of the following activities, which reflect the elaborations from the Foundation to Year 8 AC: Digital Technologies:

- Plan and create text, drawings and sound files to share online; for example, jointly create a photo story to illustrate a fable or fairy-tale from the Asia region or a local Aboriginal and Torres Strait Islander community story.
- Use different design tools to record ways in which digital solutions will be developed; for example, create storyboards or flow charts to record relationships or instructions about content or processes.
- Explore common elements of standard user interfaces that are familiar and appeal to users; for example, navigation links on the left and top of webpages to help users interact with the site.
- Implement programs that make decisions based on user input or choices, such as through selecting a button, pushing a key or moving a mouse to 'branch' to a different segment of the solution.

- Compare student solutions with existing solutions that solve similar problems; for example, identify differences in the user interface of two adventure games and explain how these differences affect the usability or appeal of the game.
- Judge the quality of a student solution based on specific criteria, such as meeting an economic need or contributing to social sustainability.
- Investigate what features of touch input rather than keyboard or mouse input contribute to their success in meeting a wide range of needs; for example, mimicking a common movement, such as expanding or contracting a hand to change the size of an object on screen, suits users with a range of dexterity.

ICT scale: level 6

Exemplar item 6 (Figure 7.10) shows the large task from the Slide Show test module (see chapter 2 for further details of the test modules). Student responses to this task were assessed using six criteria (one criterion had a maximum of two score points and five had a maximum of one score point). This was an example of a task that required students to apply their knowledge of digital applications and how the importance of editing effectively enhances communication on a given topic. In order to complete the task, students needed to be aware of the conventions for creating effective factual presentations through a digital lens and the importance of user experience with applications such as font and image choice, and background colour. Successful completion of this task was indicative of students' capacity to create a short presentation with effective execution of continuity and information.



Per cent correct	
Year 6	Year 10
1	9

NAP–ICT Literacy Assessment Framework reference	
Strand	Working with information
Process	Select and evaluate data and information
Australian Curriculum: Digital Technologies indicative reference	
Knowledge	Years 5 and 6 – N/A Years 7 and 8 – N/A
Skills	Years 5 and 6 – ACTDIP021: Explain how student solutions and existing information systems are sustainable and meet current and future local community needs Years 7 and 8 – ACTDIP028: Design the user experience of a digital system, generating, evaluating and communicating alternative designs
Australian Curriculum: ICT Capability reference	
Element	Investigating with ICT (Select and evaluate data and information)

Figure 7.10 Exemplar item 6

To gain full credit for this item, students were required to undertake multiple steps, such as: include a relevant and identifiable title in a presentation, select and edit information and images that are relevant to the topic and target audience, ensure the information in each script note section supports and expands on the content of the slide, design a layout for images and text in a slide show, select font size and style to suit a slide show presentation, and select colour of text and background.

Students who demonstrated all elements of the task gained full credit for this item. They demonstrated high technical proficiency, careful planning and an ability to review their work and use software features to enhance the communicative effect of their work.

To achieve level 6, students were required to demonstrate a high level of ICT literacy. An example of achievement against one descriptor is shown below:

Descriptor	Y6	Y10
Selects and edits all relevant information and images in a way that enhances communication on the topic for the target audience (Code 2 Max 2)	**1%**	**9%**

An example of a short response required students to explain how to upload a file to a cloud drive. Full credit for this particular task was gained by 6 per cent of Year 6 students and 14 per cent of Year 10 students.

In supporting students in the development and extension of the knowledge, understanding and skills associated with this item, teachers might consider using one or more of the following activities, which reflect the elaborations from the Foundation to Year 8 AC: Digital Technologies:

- Test the adequacy of student solutions; for example, ask a classmate to review a digital solution and provide feedback.
- Explain why people interact so readily with touch systems; for example, touch input requires less dexterity to issue instructions and is designed to be accessible to users through the use of icons.
- Imagine how the functioning of one type of information system could be applied in a new way to meet a community or national need; for example, consider how an electronic tracking system such as a global positioning system (GPS) could be used to find people who are lost.
- Design the user interface of a solution using a range of design tools; for example, use a storyboard to explain the stages of a game, and wire-frames and mock-ups to describe the appearance of a solution.
- Identify features that make an effective game, such as storyline, goal, reward, conflict/challenge, strategy and chance, gameplay and environment/aesthetics.
- Identify similar digital systems and their user interfaces, assessing whether user interface elements can be re-used.

- Present and compare alternative designs to a solution for a problem; for example, present alternative design mock-ups to the class.
- Apply the principles and elements of design to a series of solutions to evaluate the success of each solution to hold the viewer's attention; for example, identify which colour combinations or framing of visual elements keep different audiences engaged with on-screen activity.

Students' attitudes towards and engagement with ICT and digital technologies

This chapter has previously offered many strategies to encourage effective student engagement with digital technologies and to improve overall ICT literacy for all students. This section explores more closely student responses to the NAP–ICT Literacy 2017 student survey, as identified in detail in chapters 5 and 6.

Use of digital technology

The survey asked students to reflect on their use of both hardware and software, in school and outside of school. The survey results indicate the following:

- There is strong use of digital devices by classroom teachers to present information to the class in both Year 6 and Year 10.
- Students in both Year 6 and 10 are increasingly using digital devices to collect data for a project on a weekly basis.
- A small percentage of students in Year 6 and in Year 10 are receiving instructions on how to develop algorithms and refine code.
- There is no significant difference between the way males and females are engaging with productivity applications and specialist applications in either Year 6 or Year 10.

Classroom use of digital devices

Sixty-seven per cent of Year 6 students and 76 per cent of Year 10 students reported their teachers as regularly using digital devices to present within the classroom (see Table 6.3). This is important for demonstrating communicating with ICT.

However, the use of digital devices for collaboration and communication with experts was reported as far less frequently experienced by students. For example, 59 per cent of Year 6 students and 50 per cent of Year 10 students indicated they never use digital devices to collaborate with students from other schools. Furthermore, 65 per cent of Year 6 students and 52 per cent of Year 10 students never use the internet to contact experts outside the school.

Student access to and interest in using technology

Students are accessing mobile technology such as smartphones and tablets outside of school at a higher percentage rate than they are accessing more traditional technology such as computers and laptops. This is in contrast to what students have access to within schools, with desktop and portable computers sitting at 81 per cent for Year 6 and 86 per cent for Year 10.

Further engagement to build upon student interest in using digital devices may be developed across learning areas through the AC: ICT Capability:

From Foundation to Year 8:

Communicating with ICT
• collaborate, share and exchange
• understanding computer-mediated communications
Applying social and ethical protocols and practices when using ICT
• applying personal security protocols
• applying digital information security practices

Specifically, in AC: Digital Technologies, levels may be built upon and developed in the classroom through the following content descriptions and elaborations:

Content descriptions	Elaborations
Create and organise ideas and information using information systems independently and with others, and share these with known people in safe online environments (ACTDIP006)	Participating in safe online environments; for example, sharing ideas and information through intranets, messaging only people they know and moderated online spaces **AC: ICT Capability elements: (Applying social and ethical protocols and practices when using ICT, Communicating with ICT)** **NAP–ICTL Assessment Framework process: (Using ICT appropriately)**
Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)	Using a range of online tools to share information and being aware that information may be received at different times **AC: ICT Capability element: (Communicating with ICT)** **NAP–ICTL Assessment Framework process: (Communicating)**
Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols (ACTDIP022)	Develop a set of rules about appropriate conduct, language and content when communicating online, and using these rules as a basis for resolving ethical dilemmas **AC: ICT Capability element: (Applying social and ethical protocols and practices when using ICT)** **NAP–ICTL Assessment Framework process: (Using ICT appropriately)**

Plan and manage projects that create and communicate ideas and information collaboratively online, taking safety and social contexts into account (ACTDIP032)	Devising and applying protocols to manage the collaborative creation of solutions; for example, planning to use cloud computing to store common files and establishing virtual meetings that acknowledge time zone differences **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**

Student use of technology to collect data

The survey also indicates a strong response to using digital devices to collect data (Table 6.3). Both Year 6 and Year 10 students indicate the collection of data for projects occurs in the classroom on a weekly basis.

Again, teachers, schools and systems may choose to leverage this positive use of digital devices for data collection and extend students' knowledge and skills in the interpretation and representation of data. Exposing students to the ways in which data is created, stored and managed on computers and the wide variety of tasks that the data can be used for will provide a foundation for interpreting and representing it. Data may include characters (for example, alphabetic letters, numbers and symbols), images and sounds.

Exploring a variety of applications to represent the data, such as infographs, coding applications and podcast analytics, will provide students with a broader understanding of data in their digital world. Further engagement to build upon these levels may be developed by reviewing how ICT skills are developed across all learning areas and by accessing the content descriptions and elaborations of the AC: Digital Technologies in the years up to and including Year 8:

Managing and operating with ICT
• understanding ICT systems
• selecting and using hardware and software
• managing digital data
Investigating with ICT
• select and evaluate data and information
• locate, generate and access data and information

Specifically, in AC: Digital Technologies levels may be built upon and developed in the classroom through the following content descriptions and elaborations:

Content descriptions	Elaborations
Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002)	Sorting objects and events based on easily identified characteristics and using digital systems to represent patterns in data; for example, sorting birthdates and presenting the patterns using seasonal symbols **AC: ICT Capability element:(Investigating with ICT)** **NAP–ICTL Assessment Framework process: (Accessing and evaluating information)**
Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)	Recognising representations of different types of data, such as waves for sound **AC: ICT Capability element:(Investigating with ICT))** **NAP–ICTL Assessment Framework process: (Accessing and evaluating information)**
Examine how whole numbers are used to represent all data in digital systems (ACTDIK015)	Explaining that binary represents numbers using 1s and 0s and these represent the 'on' and 'off' electrical states, respectively, in hardware and robotics **AC: ICT Capability element:(Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**
Investigate how digital systems represent text, image and audio data in binary (ACTDIK024)	Explaining that characters in text correspond to numbers defined by the character set; for example 'A' corresponds to 65 in the ASCII and Unicode character sets **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**

Students involved in computational thinking tasks

Table 6.4 indicates the percentage of students in Year 6 and Year 10 who have received instructions on various tasks, such as developing algorithms, and debugging and developing applications. Fifteen per cent of Year 6 students and only 7 per cent of Year 10 students have been involved in a lesson on developing algorithms. These percentages drop to 8 per cent and 6 per cent respectively for debugging code. This is unsurprising as the AC: Digital Technologies was only endorsed in 2015 and implementation only began in some states in 2017.

Teachers and schools may find it beneficial for students to participate in the Bebras Challenge for computational thinking: https://challenge.bebras.edu.au/. Throughout the year there are also opportunities for students to complete Bebras 365 activities. Some of the past challenges are available on the Bebras site all year to schools: https://www.bebras.edu.au/bebras365/. For teachers' own professional development, they may wish to

engage with the University of Adelaide CSER MOOC, https://csermoocs.adelaide.edu.au/, which is available for teachers of Foundation to Year 10 students.

Teachers, schools and systems may choose to extend students' knowledge and skills in the processes and production of developing applications. By reviewing how ICT skills are developed across all learning areas and by accessing the content descriptions and elaborations of the AC: Digital Technologies in the years up to and including Year 8, further engagement to build upon these levels may be developed across learning areas through the AC: ICT Capability:

Managing and operating with ICT
• understanding ICT systems
• selecting and using hardware and software
• managing digital data
Creating with ICT
• generate solutions to challenges and learning area tasks
• generate ideas, plans and processes

Specifically, in AC: Digital Technologies levels may be built upon and developed in the classroom through the following content descriptions and elaborations:

Content descriptions	Elaborations
Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004)	Recognising sequences of instructions or events that are commonly experienced, such as the sequence for traffic lights or the instructions for recording a TV show, or how their lunch order is taken and delivered **AC: ICT Capability element: (Creating with ICT)** **NAP–ICTL Assessment Framework process: (Developing new understandings)**
Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)	Implementing programs that make decisions on the basis of user input or choices, such as through selecting a button, pushing a key or moving a mouse to `branch' to a different segment of a solution **AC: ICT Capability element: (Managing and operating ICT)** **NAP–ICTL Assessment Framework process: (Managing information)**
Design, modify and follow simple algorithms involving sequences of steps, branching and iteration (repetition) (ACTDIP019)	Following, modifying and describing the design of a game involving simple algorithms represented diagrammatically or in English; for example, creating a flow chart with software that uses symbols to show decisions, processes and inputs and outputs **AC: ICT Capability elements: (Creating with ICT; Investigating with ICT)** **NAP–ICTL Assessment Framework processes: (Developing new understandings; Accessing and evaluating information)**

Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029)	Investigating and designing some common algorithms, such as to search, sequence, sort, merge, control data structures **AC: ICT Capability elements: (Creating with ICT, Investigating with ICT, Managing and operating ICT)** **NAP–ICTL Assessment Framework processes: (Developing new understandings, Accessing and evaluating information, Managing information)**

Teachers, schools and systems may choose to leverage the positive use of digital devices by teachers to engage more globally with communities and experts outside the school. The world of education has changed and has become global since the advent of the internet. There is also an increased awareness of the opportunities presented by digital technologies for teaching and learning. The development and growth of social networking websites may, in the future, influence greater collaboration and active learning by students. For example, platforms such as Twitter allow for professionals around the world to learn through the items that they tweet. Mystery Skype is an engaging way to inspire learning. Platforms such as these offer opportunities for students to collaborate with each other, ask questions and immerse themselves in other cultures.

Concluding comments

The AC: ICT Capability and the AC: Digital Technologies provide opportunities for teachers to engage students in the knowledge, understanding and skills, associated with the content of the NAP–ICT Literacy Assessment Framework.

The elements of the AC: ICT Capability and the AC: Digital Technologies content descriptions align with the NAP–ICT Literacy concepts as mapped out in chapter 3, Table 3.1 and the NAP–ICT Literacy Assessment Framework.

The AC: ICT Capability continua and the sequence of content for the AC: Digital Technologies can be used by teachers, schools and systems to support the development of student proficiency in ICT literacy. They can also be used to respond to and build upon the trends in student attitudes, actions and levels of engagement identified in the NAP–ICTL student survey.

The AC: ICT Capability and the AC: Digital Technologies are designed to foster knowledge, understanding and skills for students to become digitally literate individuals who are confident to investigate, create and communicate with ICT. They provide a lens through which student performance and proficiency in the NAP–ICT Literacy assessment can now be viewed, analysed and supported.

Appendix 1

NAP–ICT Literacy Assessment Framework

The assessment framework contents have been adapted from the complete NAP–ICT Literacy Assessment Framework document, which can be found at the Assessment Frameworks page of the NAP website:

https://nap.edu.au/nap-sample-assessments/assessment-frameworks

ICT Literacy definition

The Council of Australian Governments (COAG) Educational Council for use in the National Assessment Program defines ICT literacy as:

> The ability of individuals to use ICT appropriately to access, manage and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society.

This definition, together with a set of six ICT literacy processes and three key outcomes organised into strands (presented below), forms the basis of the NAP–ICT Literacy assessment framework. This has provided the foundation of the student assessment across all five cycles of NAP–ICT Literacy.

NAP–ICT Literacy processes

NAP–ICT Literacy includes six processes which are listed and described in Table 1 below.

Table A1.1 NAP–ICT Literacy strands

Process	Description
Accessing information	Identifying information requirements and knowing how to find and retrieve information
Managing information	Organising and storing information for retrieval and reuse
Evaluating	Reflecting on the processes used to design and construct ICT solutions and judgements regarding the integrity, relevance and usefulness of information
Developing new understandings	Creating information and knowledge by synthesising, adapting, applying, designing, inventing or authoring
Communicating	Exchanging information by sharing knowledge and creating information products to suit the audience, the context and the medium
Using ICT appropriately	Making critical , reflective and strategic ICT decisions and considering social, legal and ethical issues

NAP–ICT Literacy strands

The NAP–ICT Literacy assessment content is organised according to three strands: working with information, creating and sharing information and using ICT responsibly. These strands were developed to describe discrete constructs. Strands A and B are logical process groupings of ICT use while Strand C focuses on understandings of responsible ICT use.

The following is a description of the three strands of the NAP–ICT Literacy assessment framework.

Strand A: Working with information

This strand includes identifying the information needed; formulating and executing a strategy to find information; making judgements about the integrity of the source and content of the information; and organising and storing information for retrieval and reuse.

Strand B: Creating and sharing information

This strand includes adapting and authoring information; analysing and making choices about the nature of the information product; reframing and expanding existing information to develop new understandings; and collaborating and communicating with others.

Strand C: Using ICT responsibly

This strand includes understanding the capacity of ICT to make an impact on individuals and society, and the consequent responsibility to use and communicate information legally and ethically.

Figure A1.1 shows the relationship between the three strands and the six NAP–ICT Literacy processes. The six processes are discernible across all the strands; however, their prominence may vary between the strands. The organisation of the assessment framework into three strands is intended to assist with the development of assessment tasks and the subsequent interpretation of student responses to the assessment tasks.

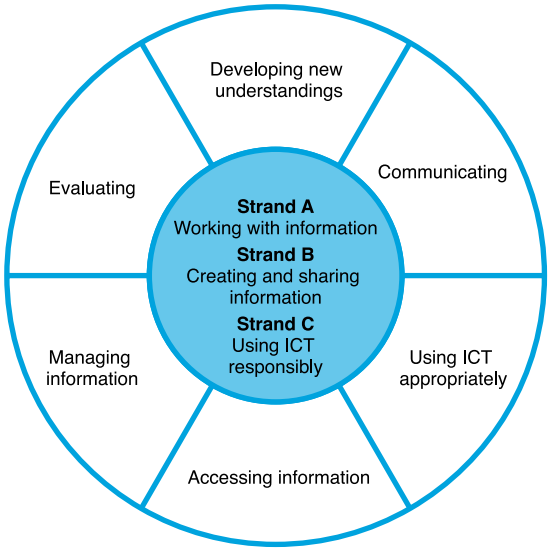


Figure A1.1 The NAP–ICT Literacy assessment framework processes and strands

Appendix 2

Ordered map of NAP–ICT Literacy 2017 task/report descriptors

Vertical link	Scale score	Level	Task descriptor	Strand
Link	778	6	Uploads a file to a cloud drive	A
Year 6	767	5	Includes the unit of measurement in a vertical axis title	B
Link	765	5	Creates a presentation with some control of layout of text and images	A
Link	764	5	Creates title that refers to maximum and minimum temperature and data collection period	B
Link	727	5	Selects font size and style to suit a slide show presentation	A
Link	712	5	Creates a form with appropriate field types	B
Year 6	711	5	Selects and edits information and images that are relevant to the topic and target audience	A
Link	708	5	Includes the unit of measurement in a vertical axis title	B
Year 10	707	5	Adapts information appropriately for a digital poster	B
Year 10	698	5	Includes the unit of measurement in a vertical axis title	B
Year 6	688	5	Moves multiple files into a specified folder	A
Year 10	685	5	Locates an operating system's search tool	A
Link	675	5	Includes notes relevant to slides in a presentation	A
Link	671	5	Creates a title that refers to rainfall and data collection period	B
Year 10	666	5	Explains a benefit of using a .pdf format instead of a .doc format	A
Year 10	665	5	Selects and edits information and images that are relevant to the topic and target audience	A
Link	659	5	Identifies the hyperlink for the webpage content manager	C
Link	657	5	Creates a presentation with some controlled use of colour	A
Link	638	4	Uses a sorting method to group files	A
Link	631	4	Creates appropriate captions to support images	A
Link	623	4	Formats images appropriately for a page spread in a digital photo book	A

Vertical link	Scale score	Level	Task descriptor	Strand
Link	614	4	Transfers text content from a source document to a digital photo book	A
Year 6	611	4	Explains why a link to activate an account is sent by email rather than being displayed on screen	C
Link	606	4	Creates a balanced design for text elements in a digital photo book	A
Year 10	604	4	Uses persuasive language to support a digital poster	B
Year 10	602	4	Formats font so that it is easy to read as part of a short animated video	A
Link	599	4	Gives an example of what happens to anti-virus software when it is updated	C
Year 10	599	4	Evaluates the reliability of information presented in a website	A
Year 10	596	4	Explains how technology can improve reporting processes	A
Link	595	4	Creates a short animated video that flows due to continuity in animation technique and adjacency in content	B
Year 10	595	4	Moves multiple files into a specified folder	A
Link	592	4	Navigates website menus to locate a specified resource	A
Link	589	4	Creates a balanced design with images and text	A
Year 10	588	4	Chooses the most relevant search result for a specified topic	A
Year 10	585	4	Identifies relevant search engine filtering tools for improving search results	A
Year 10	579	4	Uses data to support the overall purpose of a digital poster	A
Year 10	578	4	Selects appropriate images/shapes to support information in a digital poster	A
Link	576	4	Locates an upload button on a webpage	A
Year 6	574	4	Chooses relevant images to support text for a digital photo book	A
Link	570	4	Uses data to identify a problem with a website	A
Link	569	4	Chooses and clicks on a search result according to given criteria	A
Link	563	4	Uses an installation wizard to install software to a specified folder	A
Link	548	4	Copies and pastes a URL into an email message	B
Year 10	546	4	Positions images/shapes to support meaning in a digital poster	A
Year 6	546	4	Chooses suitable text colours for page spreads in a digital photo book	A
Year 10	545	4	Explains why file versioning is useful	A
Link	542	4	Selects and uses objects in a coherent way in an short animated video	B
Year 6	541	4	Formats font so that it is easy to read as part of a short animated video	A
Link	540	4	Creates a relevant and identifiable title in a presentation	A

Vertical link	Scale score	Level	Task descriptor	Strand
Link	528	3	Analyses a website and explains why a webpage has reduced engagement	A
Link	525	3	Recognises the purpose of spyware	C
Link	525	3	Explains the benefits of file compression for a shared cloud drive	A
Link	525	3	Locates and uploads a file from a nested folder structure	A
Year 10	524	3	Explains why a link to activate an account is sent by email rather than being displayed on screen	C
Link	519	3	Selects an appropriate graph type to display rainfall data	B
Year 10	515	3	Chooses relevant images to support text for a digital photo book	A
Year 10	512	3	Sizes images/shapes appropriately for a digital poster	A
Link	511	3	Explains an advantage of storing photos on the Internet	C
Link	507	3	Configure an app to collect data from a specified date, time and location	A
Link	505	3	Crops an image to remove the background	A
Link	505	3	Sets horizontal graph scale to daily	B
Year 6	504	3	Recognises sponsored links in search engine results page	A
Link	504	3	Sets horizontal graph scale to daily	B
Link	498	3	Identifies a weakness of four digit passcodes	A
Link	496	3	Creates relevant title	A
Year 6	493	3	Navigates to a specified webpage	A
Year 10	491	3	Chooses suitable text colours for page spreads in a digital photo book	A
Link	485	3	Identifies a sorting method to group files	A
Year 10	478	3	Explains copyright and attribution requirements for content found on the internet	C
Link	472	3	Selects the search result most likely to provide information on a given topic	A
Year 10	471	3	Completes an online registration form to upload a video to a video sharing site	A
Link	467	3	Makes a clear and easy to understand message in a short animated video	B
Link	464	3	Identifies an advantage of storing data locally rather than in cloud storage	A
Link	463	3	Identifies a benefit of saving a file from the Internet before opening it	C
Year 10	458	3	Creates an appropriate title for a video file	A
Link	441	3	Sets rainfall data as the source for a graph	B
Link	440	3	Locates and click on the Edit button to edit an image	A
Link	438	3	Navigates software menus and configures software settings	A

Vertical link	Scale score	Level	Task descriptor	Strand
Link	437	3	Selects relevant images to support information on a webpage	A
Link	433	3	Explains how to improve a website menu design for navigability	A
Link	432	3	Locates and opens a specified file	A
Link	431	3	Locates a file in a specified location in a folder tree	A
Year 10	431	3	Recognises sponsored links in search engine results page	A
Link	429	3	Locates a browser's bookmarks menu and selects a specified bookmark	A
Year 6	425	3	Explains copyright and attribution requirements for content found on the internet	C
Year 10	421	3	Distinguishes between paid search results and non-paid search results	A
Link	420	3	Adjusts settings to reduce the size of a file to upload to a video sharing site	A
Year 6	419	3	Completes an online registration form to upload a video to a video sharing site	A
Link	416	3	Sets temperature data as the source for a graph	B
Link	412	3	Selects the correct browser tab to access a search engine	A
Year 10	412	3	Creates a new specified folder	A
Link	411	3	Selects an appropriate graph type to display temperature data	B
Year 6	404	2	Creates an appropriate title for a video file	A
Link	399	2	Explains why saving a file with a generic filename may cause a problem	A
Link	399	2	Identifies a problem with websites remembering a user's password	C
Link	388	2	Clicks on an icon that will provide access stored data	A
Year 10	387	2	Modifies screen settings on a tablet computer	A
Year 10	383	2	Selects the most appropriate search term for a given topic	A
Year 10	378	2	Explains the right to control personal information	C
Year 6	362	2	Creates a new specified folder	A
Year 10	359	2	Uses the date modified property to identify the relevant file	A
Link	359	2	Selects a specified hyperlink	A
Link	354	2	Selects the strongest password according to length and range of character types	C
Link	348	2	Identifies the main purpose of a software license agreement	C
Link	347	2	Identifies the meaning of 'public' for a website privacy setting	C
Year 6	331	2	Selects the most appropriate search term for a given topic	A
Year 6	330	2	Modifies screen settings on a tablet computer	A
Link	330	2	Navigates a user interface to find a specified function	A

Vertical link	Scale score	Level	Task descriptor	Strand
Link	329	2	Locates a data file within a folder tree based on the source of the data	A
Link	324	2	Uses tools (slide control) to brighten an image	A
Link	322	2	Configures an app to collect data from a specified location	A
Link	319	2	Identifies a file with slowest load time	A
Link	318	2	Decreases the width of an image according to specifications	A
Link	316	2	Clicks on a hyperlink embedded in a paragraph	A
Link	309	2	Erases specified elements of an image	A
Link	296	2	Identifies a method to improve file transfer speed	A
Year 10	273	1	Selects the correct hyperlink presented in an email	A
Link	272	1	Uses tools to rotate image 180 degrees	A
Link	271	1	Selects the correct edit button on a webpage	A
Year 10	268	1	Enters a specified username into the appropriate field	A
Link	263	1	Locates an edit button on a webpage	A
Link	243	1	Clicks on a hyperlink in an email message	A
Link	243	1	Clicks on a hyperlink in an email	A
Year 6	223	1	Selects the correct hyperlink presented in an email	A
Year 6	208	1	Enters a specified username into the appropriate field	A
Year 10	207	1	Adjusts the brightness of a dark image	A
Link	159	1	Locates a button on a webpage	A
Year 6	139	1	Adjusts the brightness of a dark image	A

Appendix 3

Student survey

Q1 **How long have you been using the following digital devices?**
(Select one response for each digital device.)

	Never or less than one year	At least one year but less than three years	At least three years but less than five years	At least five years but less than seven years	Seven years or more
Computers (desktop or portable)	○	○	○	○	○
Tablets	○	○	○	○	○

Q2 **What type of digital devices do you use in the following places?**
(Select as many responses as are relevant to you for each place.)

	Computer (desktop or portable)	Tablet with on-screen keyboard	Tablet with external keyboard	Smartphone (to access the internet or use apps)	None
At school	☐	☐	☐	☐	☐
Outside of school	☐	☐	☐	☐	☐

Q3 **Do you have your own portable digital device for use in class?**
(Select one response for each device.)

	No	Yes, my school provides me with the device	Yes, the school tells me what brand or model of device I may bring	Yes, I can bring any brand or model of device to school
Notebook computer or netbook	○	○	○	○
Tablet	○	○	○	○

Q4 **How often do you use each type of digital device in the following places?**
(Use drop-down menu to select one option for each of **At School** and **Outside of School**.)

	At school	Outside of school
Desktop, laptop, netbook		
Tablet		

Q5 **To what extent do you agree or disagree with each of the following statements?**
(Select one response for each statement.)

	Strongly agree	Agree	Disagree	Strongly disagree
I like using digital devices because they help me improve the quality of my work.	○	○	○	○
I like using digital devices because they make work easier.	○	○	○	○
I enjoy using digital devices because they help me to work with others.	○	○	○	○
I enjoy using digital devices because they help me to communicate with my friends.	○	○	○	○
I like using digital devices to find new ways to do things.	○	○	○	○
It is very important to me to work with a digital device.	○	○	○	○

Q6 **How often do you use a digital device to do each of the following?**
(Use the drop-down menu to select one option for each of **At School** and **Outside of School**.)

Remember to scroll.

	At school	Outside of school
Search the Internet for information for study or school work		
Use word processing software or apps to write documents		
Use spreadsheets to draw a graph or perform calculations		
Use mathematics, language or other learning programs on a computer		
Enter data in a spreadsheet		
Create presentations for school projects		
Contribute written material or digital products (e.g. art work or photographic images) to online content		
Watch online videos to support your own learning		
Organise your program of work on a topic using a learning management system (e.g. Moodle, Compass)		
Reflect on your learning experiences (e.g. through a blog)		

Q7 **How often do you use a digital device to do each of the following?**
(Use the drop-down menu to select one option for each of **At school** and **Outside of school**.)

	At school	Outside of school
Watch downloaded or streamed videos for entertainment		
Play single-player games		
Play multi-player games		
Use software to create sounds/music, movies, animations or artwork		
Listen to downloaded or streamed music or other audio for entertainment		

Q8 **How often do you use a digital device to do each of the following**
(Use drop-down menu to select one option for each of **At School** and **Outside of School**.)

	At school	Outside of school
Emailing		
Chatting		
Write or reply to blogs or forum threads		
Use voice or video chat to communicate with people online (e.g. Skype, FaceTime)		
Upload text, images or video to an online profile		
Communicate with others using social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)		

Q9 **How often do you use a digital device to do each of the following?**
(Use the drop-down menu to select one option for each of **At School** and **Outside of School**.)

	At School	Outside of School
Write code, programs or macros (e.g. HTML, Javascript, Java, C+, Xcode, Swift, SDK)		
Create programs with a visual coding tool (e.g. Scratch, Kodable, GameMaker)		
Upload media you have created to the Internet		
Construct websites		
Use drawing, painting or graphics programs		
Use software to find and get rid of computer viruses		
Remix or edit music, video, images, or text to produce digital content		

Remember to scroll.

Q10 **How well can you do each of these tasks on a digital device?**
(Select one response for each task.)

	I can do this easily by myself	I can do this with a bit of effort	I know what this means but I cannot do it	I don't know what this means
Edit digital photographs or other graphic images	○	○	○	○
Create a database (e.g. using Microsoft Access, FileMaker)	○	○	○	○
Enter data in a spreadsheet (e.g. using Microsoft Excel)	○	○	○	○
Use spreadsheet software (e.g. Microsoft Excel) to plot a graph	○	○	○	○
Download music from the Internet	○	○	○	○
Create a multimedia presentation (with sound, pictures, video)	○	○	○	○
Construct a webpage	○	○	○	○
Upload files (images, audio/video and text) to a website	○	○	○	○
Use social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)	○	○	○	○

Q11 **At school, have you learnt about the following issues?**
(Select one response for each issue.)

	Yes	No
The need to provide references to content from webpages that you include in your schoolwork	○	○
The need to know whether you have copyright permission to download music or video	○	○
The problems of using software to copy or download files for free (such as games or videos) that you otherwise would have to pay for	○	○
Checking the credentials of software patches before downloading and accepting them	○	○
Changing your password for internet services (e.g. email) regularly	○	○
Reporting spam to an authority (such as a teacher or parent)	○	○
Reading licence or usage agreements before you click on 'I agree' to install new software	○	○
How to decide where to look for information about an unfamiliar topic	○	○
How to look for different types of digital information on a topic	○	○
How to use software to find and get rid of computer viruses	○	○

Remember to scroll.

Q12 **How often do you use the following tools for school-related purposes?**
(Select one response for each purpose.)

	Never	Less than once a month	At least once a month but not every week	At least once a week
Word processing software (e.g. Microsoft Word)	○	○	○	○
Spreadsheet software (e.g. Microsoft Excel)	○	○	○	○
Presentation software (e.g. Microsoft Powerpoint)	○	○	○	○
Software for capturing and editing media	○	○	○	○
Graphic design or drawing software	○	○	○	○
Computer-based information resources (e.g. wiki, websites)	○	○	○	○
Reflecting on your learning experiences (e.g. through a blog)	○	○	○	○
Data logging or monitoring tools	○	○	○	○
Concept mapping software (e.g. Inspiration)	○	○	○	○
Simulations and modelling software	○	○	○	○
Social media (e.g. Facebook, Twitter, Snapchat, YouTube or similar)	○	○	○	○
Robotic devices	○	○	○	○
3D printers	○	○	○	○
Computer-aided drawing (CAD) software	○	○	○	○
Communications software (e.g. Skype)	○	○	○	○

Remember to scroll.

Q13 **How often do the following activities take place in your lessons?**
(Select one response for each activity.)

	Never	Less than once a month	At least once a month but not every week	At least once a week
My teacher uses digital devices to present information to the class.	○	○	○	○
We use digital devices to present information to the class.	○	○	○	○
My teacher uses digital devices to provide us feedback on our work.	○	○	○	○
We use digital devices to collaborate with each other on projects.	○	○	○	○
We use digital devices to collaborate with students from other schools on projects.	○	○	○	○
We use digital devices to complete tests.	○	○	○	○

We use digital devices to work on short assignments (i.e. within one week).	○	○	○	○
We use digital devices to work on extended projects (i.e. projects that last longer than one week).	○	○	○	○
We use the Internet to contact students from other schools about projects.	○	○	○	○
We use the Internet to contact experts outside the school.	○	○	○	○
We use digital devices to collect data for a project.	○	○	○	○
We use digital devices to analyse data.	○	○	○	○
We use digital devices to produce or edit audio.	○	○	○	○
We create or edit visual products (e.g. animations, videos, 3D drawings).	○	○	○	○
We create or program robotic devices.	○	○	○	○

Q14 **In your lessons in the current school year, to what extent have you received instruction on how to do the following tasks?**
(Select one response for each task.)

	To a large extent	To a moderate extent	To a small extent	Not at all
Developing algorithms (e.g. instructions for a program like Scratch)	○	○	○	○
Using digital devices to present information to the class	○	○	○	○
Writing code, programs or macros	○	○	○	○
Evaluating code, programs or macros	○	○	○	○
Developing applications	○	○	○	○
Refining code to improve efficiency	○	○	○	○
Debugging code	○	○	○	○
Creating visual displays of information or processes (such as graphs, flow charts and decision trees)	○	○	○	○

Appendix 4

Sample characteristics by state and territory

This appendix describes the background characteristics of the participating students at Year 6 and Year 10, nationally and also at state and territory level.

Chapter 2 of the report presents sample characteristics nationally, but no background variables are reported by state and territory. This appendix provides more detail than Chapter 2 by reporting background characteristics (age, gender, socio-economic background – parental occupation, socio-economic background – parental education, Indigenous status, language background, country of birth, and geographic location) by state and territory, as well as the percentage of missing data for each state and territory.

The data have been weighted to allow inferences to be made about the student populations. However, it is critical for readers to appreciate that the sample was designed only to be representative of student characteristics at the national level, not at the state or territory level. Therefore, in the tables in Appendix 4 there may be some differences from expected distributions at the state or territory level; that is, due to the level of uncertainty surrounding such estimates, there is always a margin of error.

In addition, the large amount of missing data (particularly for some states and territories and for the parental occupation and education variables among all the states and territories) must be acknowledged particularly when making inferences about the data presented in these tables. When the magnitude of the missing data is judged to be too great, no comment will be made about the findings for that state or territory, or the background variable.

Age

MCEECDYA protocols mean reporting is against year levels rather than age. However, age differences may account for some of the observed differences in performance, and systematic differences in the distribution of ages in a given year level may contribute to observed differences in assessment outcomes between states and territories. Table A4.1 shows the percentages of students in age groups in the NAP–ICT Literacy sample.

Table A4.1 Age percentages of students by year level, nationally and by state and territory

	Mode	9	10	11	12	13	14	15	16	17	18	Missing
Year 6												
NSW	12		0.1%	43.6%	56.0%	0.3%						
Vic.	12	0.4%	0.1%	35.1%	62.1%	1.7%						0.6%
Qld	11		0.1%	61.5%	38.0%	0.3%						
WA	11		0.1%	64.1%	35.4%	0.1%						0.3%
SA	12			44.8%	54.3%	0.9%						
Tas.	12	0.2%		15.1%	84.5%	0.3%						
ACT	12	0.3%	0.6%	40.1%	58.8%	0.3%						
NT	11	0.3%	0.7%	55.2%	42.3%	0.5%						1.0%
Aust.	12	0.1%	0.1%	47.0%	51.9%	0.7%						0.2%
Year 10												
NSW	16						0.3%	42.8%	52.2%	1.4%	0.4%	2.9%
Vic.	16					0.1%	0.6%	32.4%	62.6%	3.5%	0.4%	0.4%
Qld	15						0.3%	77.9%	21.1%	0.6%	0.1%	
WA	15						0.1%	57.7%	38.2%	1.4%	0.3%	2.3%
SA	15						0.9%	49.6%	48.1%	1.1%		0.3%
Tas.	16							18.3%	80.3%	1.3%	0.2%	
ACT	16						0.8%	38.5%	59.0%	1.1%		0.6%
NT	15							56.3%	39.0%	4.7%		
Aust.	15					0.0%	0.4%	49.4%	46.9%	1.7%	0.3%	1.3%

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.1 shows that at the time of the assessment, 47 per cent of Year 6 students were 11 years old and 51.9 per cent were 12 years old. In Year 10, 49.4 per cent of students were 15 years old and 46.9 per cent were 16 years old. There was some variation in age across the jurisdictions. In Year 6, over half of students in Queensland (61.5%), Western Australia (64.1%), and Northern Territory (55.2%) were 11 years old, whereas the majority of students in New South Wales (56%), South Australia (54.3%), Victoria (62.1%) and Tasmania (84.5%) were already 12 years old. In Year 10, over half of Year 10 students in Queensland (77.9%), Western Australia (57.7%), South Australia (49.6%) and the Northern Territory (56.3%) were 15 years old, while the majority of students in New South Wales (52.2%), Victoria (62.6%) and Tasmania (80.3%) were already 16 years old.

Gender

Table A4.2 presents the percentages of Year 6 and Year 10 students in the sample by gender, nationally and by state and territory.

Table A4.2 Gender – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Females	48.2	45.5	50.7	50.5	48.6	45.3	46.6	43.2	54.1
	Males	51.8	54.5	49.3	49.5	51.4	54.7	53.4	56.8	45.9
Year 10	Females	47.1	49.1	47.3	43.1	45.6	50.7	52.8	42.9	48.2
	Males	52.9	50.9	52.7	56.9	54.4	49.3	47.2	57.1	51.8

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.2 shows that there were almost equal numbers of males and females in the sample, with males comprising 51.8 per cent of Year 6 students and 52.9 per cent of Year 10 students.

Socio-economic background – parental occupation

Table A4.3 presents the percentages of Year 6 and Year 10 students in the sample by parental occupation, nationally and by state and territory.

Table A4.3 Parental occupation – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Senior managers and professionals	27.5	30.5	26.4	25.4	24.7	26.1	20.4	41.4	30.8
	Other managers and associate professionals	23.1	23.2	23.7	23.3	22.6	24.4	19.0	21.5	11.9
	Tradespeople and skilled office, sales and service staff	21.7	19.1	24.6	25.1	18.8	19.0	24.0	14.0	20.8
	Unskilled workers; hospitality	13.0	14.8	14.2	10.8	10.6	13.0	17.1	2.6	10.7
	Not in paid work in last 12 months	7.5	7.0	8.9	6.6	7.9	5.7	11.4	2.2	20.6
	Missing data	7.1	5.4	2.2	8.8	15.3	11.8	8.1	18.3	5.2
Year 10	Senior managers and professionals	25.3	23.6	22.6	27.0	31.1	24.7	18.8	41.7	32.4
	Other managers and associate professionals	23.7	24.8	25.4	21.4	23.2	21.5	22.1	20.4	21.0
	Tradespeople and skilled office, sales and service staff	21.8	22.0	20.5	24.2	18.7	23.4	20.8	17.4	23.6
	Unskilled workers; hospitality	13.2	11.4	17.7	11.3	13.2	12.9	19.1	2.8	11.9
	Not in paid work in last 12 months	7.7	8.4	10.4	5.3	5.8	5.8	10.2	1.8	6.5
	Missing data	8.4	9.7	3.4	10.8	8.1	11.7	8.9	15.8	4.6

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.3 shows that there was a high level of missing data for this variable and that the amount of missing data varied across the states and territories. At Year 6, New South Wales, Victoria and the Northern Territory had the lowest amount of missing data (5.4%, 2.2% and 5.2%, respectively), while ACT had the highest amount, at 18.3 per cent. The other jurisdictions all had missing data of around 7 to 16 per cent. At Year 10, Victoria and the Northern Territory again had the lowest amount of missing data (3.4% and 4.6%, respectively), while ACT had the highest percentages (15.8%). All other jurisdictions had around 8 to 12 per cent.

Nationally, at both year levels, approximately one-quarter of the students had a senior manager or professional as parent, with the highest occupational status; parents of one-quarter were employed as "other manager or associate professional"; one-quarter as "tradespeople and skilled office, sales and service staff"; and one-quarter were "unskilled labourers, andoffice, sales and service staff" or were unemployed.

Socio-economic background – parental education

Table A4.4 presents the percentages of Year 6 and Year 10 students in the sample by parental education, nationally and by state and territory.

Table A4.4 Parental education – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Year 9 or equivalent or below	2.0	1.5	2.6	2.0	2.0	1.7	1.2	0.7	10.9
	Year 10 or equivalent	4.2	4.6	3.2	4.2	4.7	4.3	9.6	0.9	6.8
	Year 11 or equivalent	2.4	1.5	3.3	1.9	3.0	3.6	3.3	0.9	2.5
	Year 12 or equivalent	7.1	5.8	8.5	6.2	9.2	9.1	5.8	5.7	1.7
	Certificate I to IV (including Trade Certificate)	26.2	25.2	23.8	30.3	26.9	24.7	38.8	15.3	23.6
	Advanced diploma/Diploma	14.0	14.1	12.0	16.5	13.9	15.3	11.2	10.6	13.2
	Bachelor degree or above	38.6	39.6	44.2	35.2	31.9	35.5	25.4	54.6	32.3
	Missing data	5.4	7.6	2.4	3.6	8.3	5.7	4.6	11.4	9.0
Year 10	Year 9 or equivalent or below	2.5	3.4	2.8	1.7	1.7	1.6	0.8	0.3	7.9
	Year 10 or equivalent	3.9	2.6	3.5	5.3	5.1	2.3	13.3	1.6	6.6
	Year 11 or equivalent	2.6	0.9	4.7	2.0	2.3	5.2	3.8	0.6	2.9
	Year 12 or equivalent	7.6	5.3	10.5	8.8	6.2	8.0	6.6	5.1	5.1
	Certificate I to IV (including Trade Certificate)	25.7	24.9	23.8	27.7	24.7	30.6	33.9	13.0	31.2
	Advanced diploma/Diploma	14.2	12.4	14.5	16.9	13.5	14.4	13.1	12.3	12.1
	Bachelor degree or above	35.9	40.7	35.8	30.2	36.8	31.1	21.0	58.7	26.2
	Missing data	7.7	9.9	4.4	7.4	9.8	6.8	7.5	8.4	8.0

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.4 shows that, similar to parental occupation, there was a high level of missing data for this variable and that the amount of missing data varied considerably across the states and territories. At Year 6, Victoria and Queensland had the lowest amount of missing data (2.4% and 3.6%, respectively), while ACT had the highest amount at 11.4 per cent. The other jurisdictions all had missing data of around 4 to 9 per cent. At Year 10, Victoria and South Australia had the lowest amount of missing data (4.4% and 6.8%, respectively), while New South Wales and Western Australia had the highest (9.9% and 9.8%, respectively). The other jurisdictions had around 7 to 9 per cent missing data.

At both year levels, over a third of the students had a parent with a bachelor's degree or higher, around 14 per cent had a parent with an advanced diploma or diploma and around a quarter

of the students had a parent with a TAFE or trade certificate. The remaining approximately 16 per cent of students had a parent that had completed secondary school or less.

As the level of missing data is high and variable across states and territories, no comparisons of percentages at each category will be made.

Indigenous status

Table A4.5 records the percentages of Year 6 and Year 10 students in the sample by Indigenous status, nationally and by state and territory.

Table A4.5 Indigenous status – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Non-Indigenous	93.7	94.0	98.0	92.8	87.7	94.7	87.7	96.1	65.2
	Indigenous	5.2	5.1	1.9	6.7	7.3	5.3	8.7	3.4	33.5
	Missing data	1.0	0.9	0.1	0.5	5.0	0.0	3.7	0.5	1.3
Year 10	Non-Indigenous	94.1	93.0	99.2	89.6	95.8	97.3	87.2	95.1	70.5
	Indigenous	3.5	2.9	0.7	6.1	3.3	2.5	9.9	2.8	28.6
	Missing data	2.4	4.0	0.1	4.3	0.9	0.2	2.9	2.1	0.9

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.5 shows that for Year 6 and Year 10 students, 5.2 per cent and 3.5 per cent respectively were identified as being of Aboriginal or Torres Strait Islander origin. At Year 6, the Northern Territory had the highest proportion of Indigenous students in their sample (33.5%), while Victoria had the lowest at 1.9 per cent. All other jurisdictions had between 3 and 9 per cent of students identified as being of Aboriginal or Torres Strait Islander origin. At Year 10, the Northern Territory again had the highest proportion of Indigenous students in their sample (28.6%), while Victoria had the lowest at 0.7 per cent. All other jurisdictions had between 2 and 10 per cent of students identified as being of Aboriginal or Torres Strait Islander origin.

Language background – language other than English spoken at home

Table A4.6 records the percentages of Year 6 and Year 10 students by language background, nationally and by state and territory.

Table A4.6 Language spoken at home – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Not LBOTE	74.7	71.5	71.9	87.6	57.4	79.8	95.6	81.2	58.4
	LBOTE	21.6	27.8	28.0	11.8	15.6	13.7	3.5	17.9	37.5
	Missing data	3.7	0.6	0.1	0.6	27.0	6.5	0.9	0.9	4.1
Year 10	Not LBOTE	70.5	60.1	70.8	83.5	63.0	76.8	95.8	81.9	66.6
	LBOTE	26.9	39.8	28.5	14.5	22.8	16.9	3.8	14.7	32.2
	Missing data	2.6	0.1	0.7	2.0	14.1	6.3	0.4	3.4	1.3

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.6 shows that 21.6 per cent of students at Year 6 and 26.9 per cent of students at Year 10 came from homes in which languages other than English were spoken (in place of or in addition to English). While New South Wales, Victoria, Queensland and Tasmania had minimal missing data at both year levels, Western Australia had substantially higher levels of missing data (27% and 14.1% for Years 6 and 10, respectively).

Country of birth

Table A4.7 displays the percentages of Year 6 and Year 10 students in the sample born in Australia and overseas, nationally and by state and territory.

Table A4.7 Country of birth – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Australia	87.5	89.6	87.1	88.3	80.1	87.4	92.9	87.2	81.0
	Overseas	12.0	10.1	12.7	11.7	18.5	11.6	4.0	12.3	17.7
	Missing data	0.5	0.3	0.2	0.0	1.4	1.0	3.1	0.5	1.2
Year 10	Australia	81.2	84.4	77.6	81.4	75.8	82.5	93.3	84.4	81.2
	Overseas	18.4	15.6	22.2	18.5	23.9	15.4	5.3	14.5	18.8
	Missing data	0.3	0.0	0.2	0.1	0.3	2.1	1.4	1.0	0.0

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.7 shows that, nationally, around 12 per cent of Year 6 students and 18.4 per cent of Year 10 students were born outside of Australia. The level of missing data was relatively low for this variable, with most states and territories having less than 2 per cent. Tasmania had the largest percentages of missing data for this variable at 3.1 per cent at Year 6. Across the jurisdictions, Tasmania had the lowest percentage of students born outside of Australia (4% and 5.3% for Year 6 and Year 10, respectively). Western Australia and the Northern Territory had the highest proportion of students reported to be born outside Australia in Year 6 (18.5% and 17.7%, respectively), as well as in Year 10 (23.9% and 18.8%, respectively).

Geographic location

For the purposes of this appendix, "geographic location" refers to whether a student attended school in a metropolitan, regional or remote zone.

- Metropolitan zones included all state and territory capital cities except Darwin and major urban areas with populations above 100,000 (such as Geelong, Wollongong and the Gold Coast).
- Regional zones took in regional cities (including Darwin) and regional areas.
- Remote zones were areas of low accessibility, such as Katherine and Coober Pedy.

Table A4.8 presents the percentages of Year 6 and Year 10 students in the sample by geographic location of school, nationally and by state and territory.

Table A4.8 Geographic location – percentages of students by year level, nationally and by state and territory

		Aust.	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT
Year 6	Metropolitan	71.2	70.9	81.0	63.1	81.3	76.8	0.0	88.0	0.0
	Regional	27.5	29.1	19.0	35.5	14.1	19.4	100.0	12.0	76.3
	Remote	1.3	0.0	0.0	1.4	4.6	3.7	0.0	0.0	23.7
	Missing data	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Year 10	Metropolitan	70.7	77.5	76.0	56.4	77.6	81.9	0.0	95.3	0.0
	Regional	27.2	22.5	24.0	41.6	18.4	16.9	100.0	4.7	75.2
	Remote	1.2	0.0	0.0	2.0	4.0	1.2	0.0	0.0	24.8
	Missing data	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Because results are rounded to one decimal place, some totals may appear inconsistent.

Table A4.8 shows that approximately 71 per cent of the students assessed attended school in metropolitan areas. About 27 per cent attended school in regional areas, while only 1 per cent went to school in remote areas.

As might be expected, there were some variations among the states and territories in the distribution of students across metropolitan, regional and remote areas. On the basis of the weighted data, most students in the ACT attend school in metropolitan areas (88% and 95.3% in Year 6 and Year 10, respectively), compared with none in the Northern Territory and Tasmania, as Darwin and Hobart were classified as regional cities.

The Northern Territory had the greatest number of students in remote areas (23.7% at Year 6 and 24.8% at Year 10), followed by Western Australia (4.6% at Year 6 and 4% at Year 10).

Appendix 5

Reporting of results

The students assessed in NAP–ICT Literacy 2017 were selected using a two-stage cluster sampling procedure. At the first stage, schools were sampled from a sampling frame with a probability proportional to their size as measured by student enrolments in the relevant year level. In the second stage, 20 students at each year level were randomly sampled within schools (see chapter 3 on sampling and weighting). Applying cluster sampling techniques is an efficient and economical way of selecting students in educational research. However, as these samples were not obtained through (one-stage) simple random sampling, standard formulae to obtain sampling errors of population estimates are not appropriate. In addition, NAP–ICT Literacy estimates were obtained using plausible value methodology (see chapter 6 on scaling procedures), which allows for estimating and combining the measurement error of achievement scores with their sampling error.

This chapter describes the method applied for estimating sampling as well as measurement error. In addition, it contains a description of the types of statistical analyses and significance tests that were carried out for reporting of results in the *NAP–ICT Literacy Years 6 and 10 Report 2017.*

Computation of sampling and measurement variance

Unbiased standard errors from studies should include both sampling variance and measurement variance. One way of estimating sampling variance on population estimates from cluster samples is by utilising the application of replication techniques (Wolter, 1985; Gonzalez and Foy, 2000). The sampling variances of population means, differences, percentages and correlation coefficients in NAP–ICT Literacy studies were estimated using the jackknife repeated replication technique (JRR). The other component of the standard error of achievement test scores, the measurement variance, can be derived from the variance among the five plausible values for NAP–ICT Literacy. In addition, for comparing achievement test scores with those from previous cycles (2005, 2008, 2011 and 2014), an equating error was added as a third component of the standard error.

Replicate weights

When applying the JRR method for stratified samples, primary sampling units (PSUs) – in this case schools – are paired into pseudo-strata, also called sampling zones. The assignment of schools to these sampling zones needs to be consistent with the sampling frame from which they were sampled (to obtain pairs of schools that were adjacent in the sampling frame) and zones are always constructed within explicit strata of the sampling frame. This procedure ensures that schools within each zone are as similar to each other as possible.[1] For NAP–ICT Literacy 2017, there were 169 sampling zones in Year 6 and 159 in Year 10.

Within each sampling zone, one school was randomly assigned a value of two whereas the other one received a value of zero. To create replicate weights for each of these sampling zones, the jackknife indicator variable was multiplied by the original sampling weights of students within the corresponding zone so that one of the paired schools had a contribution of zero and the other school had a double contribution, whereas schools from all other sampling zones remained unmodified.

At each year level, 169 replicate weights were computed. In Year 10, which had only 159 sampling zones, the last 10 replicate weights were equal to the final sampling weight. This was done in order to have a consistent number of replicate weight variables in the final database.

Standard errors

In order to compute the sampling variance for a statistic t, t is estimated once for the original sample S and then for each of the jackknife replicates J_h. The JRR variance is computed using the formula:

$$Var_{jrr}(t) = \sum_{h=1}^{H} \left[t(J_h) - t(S) \right]^2$$

where H is the number of replicate weights, $t(S)$ the statistic t estimated for the population using the final sampling weights, and $t(J_h)$ the same statistic estimated using the weights for the h_{th} jackknife replicate. For all statistics that are based on variables other than student test scores (plausible values), the standard error of t is equal to:

$$\sigma(t) = \sqrt{Var_{jrr}(t)}$$

[1] In the case of an odd number of schools within an explicit stratum on the sampling frame, the remaining school is randomly divided into two halves and each half assigned to the two other schools in the final sampling zone to form *pseudo-schools*.

The computation of JRR variance can be obtained for any statistic. However, many standard statistical software packages like SPSS® do not generally include any procedures for replication techniques. Therefore, specialist software, the SPSS® replicates add-in, was used to run tailored SPSS® macros to estimate JRR variance for means and percentages.[2]

Population statistics for NAP–ICT Literacy scores were always estimated using all five plausible values with standard errors reflecting both sampling and measurement error. If t is any computed statistic and t_i is the statistic of interest computed on one plausible value, then:

$$t = \frac{1}{M}\sum_{i=1}^{M} t_i$$

with M being the number of plausible values.

The sampling variance U is calculated as the average of the sampling variance for each plausible value U_i :

$$U = \frac{1}{M}\sum_{i=1}^{M} U_i$$

Using five plausible values for data analysis allows the estimation of the error associated with the measurement of NAP–ICT Literacy due to the lack of precision of the test instrument. The measurement variance or imputation variance B_m was computed as:

$$B_m = \frac{1}{M-1}\sum_{i=1}^{M}\left(t_i - t\right)^2$$

To obtain the final standard error of NAP–ICT Literacy statistics, the sampling variance and measurement variance were combined as:

$$SE = \sqrt{U + \left(1 + \frac{1}{M}\right)B_m}$$

with U being the sampling variance.

The 95 per cent confidence interval, as presented in the *NAP–ICT Literacy Years 6 and 10 Report 2017*, was computed as 1.96 times the standard error. The actual 95 per cent confidence interval of a statistic is between the value of the statistic *minus* 1.96 times the standard error and the value of the statistic *plus* 1.96 times the standard error.

[2] Conceptual background and application of macros with examples are described in the PISA Data Analysis Manual SPSS®, Second Edition (OECD, 2009b).

Reporting of mean differences

The *NAP–ICT Literacy Years 6 and 10 Report 2017* included comparisons of achievement test results across states and territories; that is, means of scales and percentages were compared in graphs and tables. Each population estimate was accompanied by its 95 per cent confidence interval. In addition, tests of significance for the difference between estimates were provided, in order to flag results that were significant at the 5 per cent level ($p < 0.05$) which indicate a 95 per cent probability that these differences are **not** a result of sampling and measurement error.

The following types of significance tests for achievement mean differences in population estimates were reported:

- between states and territories
- between student sub-groups
- between this assessment cycle and previous ones in 2011, 2008 and 2005.

Mean differences between states and territories and year levels

Pairwise comparison charts allow the comparison of population estimates between one state or territory and another or between Year 6 and Year 10. Differences in means were considered significant when the test statistic *t* was outside the critical values ±1.96 (α = 0.05). The *t* value is calculated by dividing the difference in means by its standard error, which is given by the formula:

$$SE_{dif\_ij} = \sqrt{SE_i^2 + SE_j^2}$$

where SE_{dif_ij} is the standard error of the difference and SE_i and SE_j are the standard errors of the two means *i* and *j*. This computation of the standard error was only applied for comparisons between two samples that had been drawn independently from each other (for example, jurisdictions or year levels).

In the 2017 public report, differences were also estimated between percentages attaining the proficient standards in states and territories. The method for estimating the standard error of the difference between percentages is identical to the procedure described for mean differences.

Mean differences between dependent sub-groups

The formula for calculating the standard error described in the previous section is not appropriate for sub-groups from the same sample (see OECD, 2009b for more detailed information). Here, the covariance between the two standard errors for sub-group estimates needs to be taken into account and JRR should be used to estimate correct sampling errors of mean differences. Standard errors of differences between statistics for sub-groups from the same sample (for example, groups classified according to student

background characteristics) were derived using the SPSS® replicates add-in. Differences between sub-groups were considered significant when the test statistic *t* was outside the critical values ±1.96 ($\alpha = 0.05$). The value *t* was calculated by dividing the mean difference by its standard error.

Mean differences between assessment cycles (2005, 2008, 2011, 2014 and 2017)

The *NAP–ICT Literacy Years 6 and 10 Report 2017* also included comparisons of achievement results across assessment cycles. The process of equating tests across different achievement cycles introduced a new form of error when comparing population estimates over time: the equating or linking error. When computing the standard error, equating error as well as sampling and measurement error were taken into account. The computation of equating errors is described in chapter 6.

The value of the equating error between 2017 and the previous assessment in 2014 was 5.52 score points on the NAP–ICT Literacy scale for both year levels. When testing the difference of a statistic between these two assessment cycles, the standard error of the difference was computed as follows:

$$SE(t_{17} - t_{14}) = \sqrt{SE_{17}^2 + SE_{14}^2 + EqErr_{17\_14}^2}$$

where *t* can be any statistic in units on the NAP–ICT Literacy scale (mean, percentile, gender difference, but **not** percentages), SE_{17}^2 is the respective standard error of this statistic in 2017, SE_{14}^2 the corresponding standard error in 2014 and $EqErr_{17\ 14}^2$ the equating error for comparing 2017 with 2014 results.

When comparing population estimates between 2017 and the third assessment in 2011, two equating errors (between 2017 and 2014 and between 2014 and 2011) had to be taken into account. This was achieved by applying the following formula for the calculation of the standard error for differences between statistics from 2017 and 2011:

$$SE(\mu_{17} - \mu_{11}) = \sqrt{SE_{17}^2 + SE_{11}^2 + EqErr_{17\_11}^2}$$

where $EqErr_{17\_11}^2$ reflects the uncertainty associated with the equating between the assessment cycles of 2017 and 2014 (5.52 score points) as well as between 2014 and 2011 (4.01 score points). This combined equating error was equal to 6.83 score points and was calculated as:

$$EqErr_{17\_11} = \sqrt{EqErr_{17_{14}}^2 + EqErr_{14_{11}}^2}$$

Similarly, for comparisons between 2017 and the first NAP–ICT Literacy assessment in 2005, the equating errors between each adjacent pair of assessments had to be taken into account and standard errors for differences were computed as:

$$SE(\mu_{17} - \mu_{05}) = \sqrt{SE_{17}^2 + SE_{05}^2 + EqErr_{17\_05}^2}$$

$EqErr_{17\_05}^2$ reflects the uncertainty associated with the equating between the assessment cycles of 2017 and 2014 (5.52 score points), between 2014 and 2011 (4.01 score points), between 2011 and 2008 (5.71 score points) and between 2008 and 2005 (4.30 score points). The combined equating error was equal to 8.20 score points, and was calculated as:

$$EqErr_{17\_05} = \sqrt{EqErr_{17_{14}}^2 + EqErr_{14_{11}}^2 + EqErr_{11_{08}}^2 + EqErr_{08_{05}}^2}$$

To report the significance of differences between percentages at or above proficient standards, the corresponding equating error had to be estimated using a different approach. To obtain an estimate, the following replication method was applied to estimate the equating error for percentages at the proficient standards.

For the cut-point that defines the corresponding proficient standard at each year level (409 for Year 6 and 529 for Year 10), a number of *n* replicate cut-points were generated by adding a random error component with a mean of 0 and a standard deviation equal to the estimated equating error of 5.52 score points for comparisons between 2017 and 2014, 6.83 score points for comparisons between 2017 and 2011, 8.90 score points for comparisons between 2017 and 2008, and 9.88 score points for comparisons between 2017 and 2005. Percentages of students at or above each replicate cut-point (ρ_n) were computed and the equating error was estimated as:

$$EquErr(\rho) = \sqrt{\frac{(\rho_n - \rho_o)^2}{n}}$$

where ρ_o is the percentage of students at or above the (reported) proficient standard. The standard errors of the differences in percentages at or above proficient standards between 2017 and 2014 were calculated as:

$$SE(\rho_{17} - \rho_{14}) = \sqrt{SE(\rho_{17})^2 + SE(\rho_{14})^2 + EqErr(\rho_{17\_14})^2}$$

where ρ_{17} is the percentages at or above the proficient standard in 2017 and ρ_{14} in 2014, $SE(\rho_{17})$ and $SE(\rho_{14})$ their respective standard errors, and $EqErr(\rho_{17\_14})$ the equating error for comparisons. For estimating the standard error of the corresponding differences in percentages at or above proficient standards between 2017 and 2011, the following formula was used:

$$SE(\rho_{17} - \rho_{11}) = \sqrt{SE(\rho_{17})^2 + SE(\rho_{11})^2 + EqErr(\rho_{17\_11})^2}$$

Likewise, for estimating the standard error of the corresponding differences in percentages at or above proficient standards between 2017 and 2008 and between 2017 and 2005,the following formulae were used:

$$SE(\rho_{17} - \rho_{08}) = \sqrt{SE(\rho_{17})^2 + SE(\rho_{08})^2 + EqErr(\rho_{17\_08})^2}$$

$$SE(\rho_{17} - \rho_{05}) = \sqrt{SE(\rho_{17})^2 + SE(\rho_{05})^2 + EqErr(\rho_{17\_05})^2}$$

For NAP–ICT Literacy 2017, 5000 replicate cut-points were created. Equating errors on percentages were estimated for each sample or subsample of interest. Table A5.1 and Table A5.2 show the values of these equating errors of Year 6 and Year 10 respectively.

Table A5.1 Year 6 equating errors for comparisons between percentages

Group	2017/2014	2017/2011	2017/2008	2017/2005
Aust.	2.09	2.57	3.30	3.64
NSW	2.45	2.94	3.68	4.01
Vic.	1.76	2.22	2.93	3.25
Qld	2.23	2.72	3.48	3.83
WA	2.10	2.58	3.33	3.69
SA	1.89	2.36	3.14	3.53
Tas.	1.99	2.42	3.07	3.36
ACT	2.13	2.66	3.48	3.83
NT	1.91	2.29	2.92	3.21
Females	3.66	2.55	3.31	3.66
Males	3.63	2.59	3.30	3.63
Non-Indigenous	2.16	2.65	3.40	3.75
Indigenous	1.13	1.39	1.82	2.03
Not LBOTE	2.20	2.70	3.47	3.83
LOBTE	1.92	2.32	2.92	3.20
Not born in Australia	2.31	2.76	3.45	3.77
Born in Australia	2.06	2.54	3.28	3.62
Metropolitan	2.18	2.66	3.40	3.74
Provincial	1.88	2.35	3.07	3.41
Remote	2.22	2.72	3.42	3.70
Senior managers and professionals	2.00	2.45	3.15	3.48
Other managers and associate professionals	1.95	2.41	3.16	3.51
Tradespeople and skilled office, sales and service staff	2.60	3.18	4.05	4.43
Unskilled workers; hospitality	2.28	2.67	3.24	3.51
Not in paid work in last 12 months	1.35	1.66	2.15	2.38
Year 9	2.66	3.08	3.76	4.06
Year 10	1.00	1.23	1.62	1.82
Year 11 or equivalent	2.46	2.85	3.34	3.54
Year 12 or equivalent	2.26	2.71	3.41	3.75
Certificate I to IV (including trade certificate)	2.32	2.87	3.69	4.05
Advanced diploma/Diploma	2.03	2.58	3.42	3.79
Bachelor degree or above	2.07	2.50	3.18	3.51

Table A5.2 Year 10 equating errors for comparisons between percentages

Group	2017/2014	2017/2011	2017/2008	2017/2005
Aust.	2.21	2.76	3.61	4.01
NSW	2.35	2.87	3.68	4.06
Vic.	2.09	2.62	3.45	3.84
Qld	2.39	2.96	3.84	4.25
WA	2.25	2.83	3.77	4.21
SA	1.74	2.28	3.14	3.55
Tas.	2.62	3.26	4.21	4.63
ACT	2.87	3.32	4.02	4.36
NT	2.59	3.35	4.59	5.15
Females	4.28	2.96	3.86	4.28
Males	3.78	2.58	3.40	3.78
Non-Indigenous	2.21	2.75	3.60	3.99
Indigenous	1.92	2.57	3.57	4.02
Not LBOTE	2.33	2.90	3.78	4.20
LOBTE	1.94	2.43	3.20	3.55
Not born in Australia	2.08	2.62	3.48	3.89
Born in Australia	2.26	2.80	3.66	4.06
Metropolitan	2.11	2.62	3.42	3.79
Provincial	2.52	3.16	4.16	4.61
Remote	2.26	2.93	3.99	4.48
Senior managers and professionals	1.81	2.22	2.90	3.23
Other managers and associate professionals	2.53	3.13	4.02	4.42
Tradespeople and skilled office, sales and service staff	2.45	3.18	4.34	4.88
Unskilled workers; hospitality	2.46	2.99	3.84	4.24
Not in paid work in last 12 months	1.58	2.06	2.81	3.15
Year 9	0.89	1.28	1.97	2.31
Year 10	1.26	1.54	2.11	2.42
Year 11 or equivalent	3.28	3.96	5.07	5.59
Year 12 or equivalent	2.82	3.47	4.45	4.90
Certificate I to IV (including trade certificate)	2.75	3.43	4.49	4.97
Advanced diploma/Diploma	2.69	3.28	4.13	4.51
Bachelor degree or above	1.69	2.13	2.85	3.19

Appendix 6

Mean scores on questionnaire indices by year level and state and territory

Table A6.1 Student perception of the importance of ICT use by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±1.0)	53	(±0.8)
Vic.	50	(±0.9)	52	(±1.0)
Qld	49	(±0.8)	52	(±0.7)
WA	49	(±1.0)	51	(±0.7)
SA	50	(±0.7)	53	(±1.0)
Tas.	48	(±1.0)	49	(±0.9)
ACT	50	(±1.7)	51	(±1.0)
NT	49	(±2.5)	51	(±3.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.2 Student frequency of using study utilities on digital devices – At school by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±0.9)	49	(±1.2)
Vic.	50	(±1.1)	52	(±0.9)
Qld	49	(±1.1)	51	(±1.1)
WA	48	(±1.4)	49	(±1.1)
SA	50	(±0.9)	54	(±0.7)
Tas.	49	(±1.1)	51	(±0.9)
ACT	51	(±2.8)	52	(±0.9)
NT	48	(±1.7)	52	(±5.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.3 Student frequency of using study utilities on digital devices – Outside of school by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±1.2)	54	(±0.7)
Vic.	50	(±0.7)	54	(±0.9)
Qld	49	(±0.9)	52	(±0.9)
WA	50	(±0.9)	52	(±0.7)
SA	49	(±1.1)	53	(±0.9)
Tas.	45	(±1.0)	50	(±1.0)
ACT	51	(±1.9)	55	(±1.1)
NT	45	(±3.2)	51	(±5.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.4 Student frequency of using digital devices for entertainment purposes – At school by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±1.2)	53	(±1.1)
Vic.	49	(±1.2)	55	(±0.8)
Qld	50	(±1.0)	53	(±1.2)
WA	49	(±1.2)	53	(±1.0)
SA	50	(±0.9)	54	(±1.0)
Tas.	51	(±1.3)	54	(±0.8)
ACT	50	(±2.1)	56	(±1.3)
NT	51	(±1.3)	54	(±1.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.5 Student frequency of using digital devices for entertainment purposes – Outside of school by state and territory

State/territory	Year 6		Year 10	
NSW	50	(±0.9)	50	(±0.9)
Vic.	49	(±1.0)	50	(±0.6)
Qld	50	(±0.7)	51	(±0.9)
WA	51	(±0.9)	51	(±0.8)
SA	51	(±0.7)	50	(±0.8)
Tas.	50	(±0.9)	49	(±0.9)
ACT	51	(±1.2)	51	(±1.2)
NT	48	(±1.7)	50	(±1.7)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.6 Student frequency of using digital devices for communication activities – At school by state and territory

State/territory	Year 6		Year 10	
NSW	52	(±1.4)	59	(±1.0)
Vic.	49	(±1.5)	62	(±0.9)
Qld	51	(±1.3)	60	(±0.9)
WA	46	(±1.2)	56	(±1.2)
SA	49	(±1.4)	61	(±1.0)
Tas.	51	(±1.3)	61	(±1.1)
ACT	49	(±1.4)	63	(±1.7)
NT	49	(±2.1)	62	(±2.5)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.7 Student frequency of using digital devices for communication activities – Outside of school by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±0.7)	55	(±0.7)
Vic.	50	(±1.1)	55	(±0.6)
Qld	49	(±0.9)	54	(±0.5)
WA	50	(±1.0)	55	(±0.5)
SA	49	(±0.9)	54	(±0.5)
Tas.	50	(±1.1)	55	(±0.7)
ACT	50	(±1.3)	55	(±1.1)
NT	47	(±1.6)	54	(±3.2)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.8 Student frequency of completing technological tasks using digital devices – At school by state and territory

State/territory	Year 6		Year 10	
NSW	49	(±1.4)	49	(±1.0)
Vic.	50	(±1.1)	49	(±1.1)
Qld	50	(±1.1)	49	(±0.9)
WA	50	(±1.3)	48	(±1.1)
SA	51	(±1.2)	48	(±1.0)
Tas.	49	(±1.2)	48	(±1.3)
ACT	51	(±2.3)	48	(±1.2)
NT	49	(±2.0)	49	(±2.6)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.9 Student frequency of completing technological tasks using digital devices – Outside of school by state and territory

State/territory	Year 6		Year 10	
NSW	50	(±0.7)	49	(±1.2)
Vic.	49	(±0.8)	48	(±0.8)
Qld	51	(±0.7)	49	(±0.8)
WA	51	(±0.8)	49	(±0.7)
SA	50	(±1.0)	48	(±0.8)
Tas.	48	(±1.1)	48	(±0.8)
ACT	50	(±1.2)	49	(±1.2)
NT	48	(±2.4)	49	(±2.6)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.10 Student ICT self-efficacy by state and territory

State/territory	Year 6		Year 10	
NSW	50	(±0.9)	56	(±0.8)
Vic.	51	(±0.8)	53	(±1.0)
Qld	50	(±0.8)	54	(±0.8)
WA	49	(±0.9)	53	(±0.7)
SA	49	(±1.1)	54	(±0.7)
Tas.	49	(±0.9)	54	(±0.9)
ACT	51	(±1.5)	55	(±0.9)
NT	45	(±2.0)	53	(±4.1)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.11 Student ICT learning at school by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±0.7)	53	(±0.9)
Vic.	51	(±1.1)	52	(±0.9)
Qld	49	(±0.9)	52	(±0.8)
WA	49	(±0.7)	52	(±1.0)
SA	49	(±1.0)	53	(±0.9)
Tas.	50	(±1.0)	53	(±0.9)
ACT	52	(±1.7)	53	(±2.0)
NT	49	(±2.7)	50	(±2.9)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.12 Use of productivity applications for school-related purposes by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±1.0)	54	(±0.7)
Vic.	51	(±1.0)	55	(±1.1)
Qld	49	(±1.0)	56	(±0.9)
WA	48	(±1.3)	53	(±0.9)
SA	51	(±1.4)	58	(±0.8)
Tas.	48	(±1.6)	55	(±0.9)
ACT	49	(±2.3)	56	(±1.1)
NT	46	(±1.8)	55	(±3.0)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.13 Use of specialist applications for school-related purposes by state and territory

State/territory	Year 6		Year 10	
NSW	50	(±0.9)	50	(±1.2)
Vic.	50	(±1.0)	49	(±1.1)
Qld	50	(±0.8)	50	(±1.2)
WA	50	(±0.8)	49	(±0.9)
SA	50	(±1.0)	50	(±1.0)
Tas.	48	(±1.1)	49	(±1.2)
ACT	50	(±1.5)	49	(±1.7)
NT	48	(±1.9)	50	(±1.2)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.14 Use of digital devices in general classroom activities by state and territory

State/territory	Year 6		Year 10	
NSW	51	(±1.1)	55	(±1.1)
Vic.	51	(±1.4)	57	(±1.1)
Qld	49	(±1.3)	56	(±1.2)
WA	47	(±1.2)	52	(±1.2)
SA	50	(±1.2)	60	(±1.3)
Tas.	49	(±0.9)	55	(±1.0)
ACT	53	(±2.6)	59	(±1.2)
NT	46	(±3.1)	55	(±1.8)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.15 Use of digital devices in specialised classroom activities by state and territory

State/territory	Year 6		Year 10	
NSW	50	(±1.2)	52	(±1.2)
Vic.	50	(±1.2)	52	(±1.2)
Qld	50	(±1.2)	51	(±1.0)
WA	49	(±0.9)	51	(±1.2)
SA	50	(±1.1)	54	(±1.0)
Tas.	49	(±1.1)	51	(±1.4)
ACT	50	(±2.1)	54	(±1.8)
NT	49	(±2.7)	53	(±1.8)

*Confidence intervals (1.96*SE) are reported in brackets.*

Table A6.16 Student computational thinking–related learning at school by state and territory

State/territory	Year 6		Year 10	
NSW	49	(±1.4)	46	(±1.1)
Vic.	50	(±1.0)	45	(±1.1)
Qld	50	(±1.1)	47	(±1.0)
WA	50	(±1.0)	46	(±1.1)
SA	51	(±1.0)	45	(±0.8)
Tas.	49	(±1.1)	45	(±1.7)
ACT	51	(±2.7)	44	(±1.7)
NT	47	(±2.0)	48	(±1.3)

*Confidence intervals (1.96*SE) are reported in brackets.*