

**INTERNATIONAL COMPARATIVE STUDY: THE
AUSTRALIAN CURRICULUM AND THE FINNISH NATIONAL
CORE CURRICULUM**

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
1 PROGRAM OF RESEARCH.....	8
1.1 Background	8
1.2 Methodology.....	8
2 CONTEXTUAL DESCRIPTION AND ANALYSIS	14
2.1 Preamble	14
2.2 Demographic comparison: Australia and Finland	15
2.3 Curriculum design principles and purpose.....	30
2.3.1 The Finnish National Core Curriculum: Structure and Design principles	33
2.3.2 The Australian Curriculum: Design principles.....	36
3 COMPARATIVE STUDY.....	40
3.1 Purpose	40
3.2 Method.....	40
3.3 Data collection and analysis	40
3.4 Findings.....	41
3.5 Discussion.....	46
3.6 Curriculum comparison templates by learning area / subject / dimension	49
a) English	49
b) Mathematics	61
c) Science	80
d) Humanities and Social Sciences.....	97
e) Technologies.....	114
f) Health and Physical Education.....	135
g) Languages.....	150
h) General Capabilities.....	167
i) Cross-Curriculum Priority – Aboriginal and Torres Strait Islander Histories and Cultures 184	
j) Student Diversity.....	191
4 REFERENCES.....	196
5 LIST OF TABLES	206
6 LIST OF FIGURES.....	208
7 LIST OF ABBREVIATIONS	209
8 ACKNOWLEDGEMENTS	212

EXECUTIVE SUMMARY

This report details the findings of a study comparing the Australian Curriculum (AC) with the Finnish National Core Curriculum (FNCC).

The study is the second in a series of international comparisons with curricula of high-performing countries and systems; these comparisons are a component of the Curriculum business unit's ongoing program of research, as specified in the Australian Curriculum, Assessment and Reporting Authority's (ACARA) work plan for 2017–2020. The comparative studies will contribute to the long-term consideration of international developments in curriculum design and are intended to elicit observations that will inform the next generation of the AC. It is not the purpose of the studies to make judgements regarding the quality or effectiveness of the overall provision of education in any jurisdiction.

The selection of Finland for comparative study is based on the key criterion stipulated for this research project; that is, it is a high-performing country in education rankings. Finnish students perform consistently well in international assessments, undertaking their studies through a national curriculum that is the subject of intense global interest.

Finland is highly regarded for its innovative approach to curriculum design, particularly in relation to 21st century competences, and has implemented a new national curriculum during the last five years. As is true of Australia, Finland is an active member of the Organisation for Economic Cooperation and Development (OECD), contributing to international projects in education.

This research project takes place in a climate of increasing international competitiveness regarding student performance in assessment programs such as the International Association for the Evaluation of Educational Achievement's Programme for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS), together with expressions of concern about the capacity of school curricula to prepare students for the post-school world of the 21st century.

Contemporary research approaches to comparative education emphasise careful consideration of the local context in which curriculum is developed, rejecting any notion of an easy transfer of design or practice from systems that are judged to produce superior outcomes. A review of the literature relating to comparative education research underpins the methodological approach adopted for these international comparative studies (ACARA, 2017a). In this second comparative study, a mixed-methods approach enables a comprehensive picture of the basis for curriculum design in the two jurisdictions. Complementing the demographic and other contextual comparisons, ten small studies reveal the professional judgement of ACARA's Curriculum Specialists in their analysis of the content and expectations of the two curricula. Drawing on Webb's Depth of Knowledge schema (1997), this work includes careful evaluation of breadth, depth and rigour across learning areas.

This comparative study is based on the *Australian Curriculum Version 8.3* (ACARA, 2016), and the *Finnish National Core Curriculum for Basic Education 2014* (English translation), Publication 2016:5 (FNBE, 2016).

Comparison of the AC with FNCC reveals some commonality between the two documents in relation to intent and content. Both curricula address 21st century competences alongside the focus on traditional disciplines. A key difference in purpose and design lies in the provision of pedagogical advice in the FNCC. The Finnish document affords considerable autonomy to local authorities to make decisions about the delivery of the newly reformed national core curriculum; implementation of the AC, developed in a federal context, is dependent on the capacity of states and territories to implement curriculum in line with their discrete legislative and educational priorities.

The FNCC for Basic Education (2014) is taught within a single structure across Grades 1 to 9, catering for students aged seven to sixteen years of age (Finnish National Agency for Education (FNAE), 2014). Pre-primary education is compulsory for six-year-olds. Australian students begin formal schooling at age six and the AC organises their learning from Foundation to Year 10 – the compulsory years of schooling – with a clear distinction made between primary (F-6) and secondary (7-10).

This study reveals some commonality across learning areas and year levels in relation to breadth and depth. There is more variability across the AC and the FNCC in relation to rigour.

Findings of particular interest in this comparative study are as follows:

Flexibility of the curriculum

Finland's reformed national core curriculum is designed to "make local curricula" (Vitikka, Krokfors, & Hurmerinta, 2012). An overarching aim of the curriculum is to develop the school culture and to promote an integrative, multidisciplinary approach (Finnish National Board of Education (FNBE), 2016). In this devolved system, "the Finnish National Board of Education trusts the local authorities and teachers to draw up the local curricula according to the common guidelines", including determination of time allocated to teaching the various disciplines (Hallinen & Holappa, 2013).

The flexibility of the AC is demonstrated in the capacity of schools, according to jurisdictional and system policies and schedules, to develop programs that meet the educational needs of their students and extend and challenge students.

Prescription and volume of content

The FNCC has been developed as a normative, values-driven curriculum document (Vitikka et al., 2012). It reflects a deliberate shift from an information-centred, discipline-based curriculum to a learner-centred, competency-based design. The AC is considerably more prescriptive and detailed in relation to disciplinary content, although its three-dimensional design provides flexibility for teachers to adapt their programs for students with diverse interests and needs.

A key finding emerging from ACARA's international comparisons is the perception that any significant reduction in curriculum content may lead to a loss of intellectual rigour and pedagogical integrity. These studies have identified an apparent tension between the volume of prescribed content and the capacity of teachers to deliver a 21st century curriculum in innovative and flexible ways.

Student agency and engagement

The AC states explicitly that the document is written for teachers.

On the basis of the findings of national surveys, Finland's decision to reform the curriculum took account of the need to address student engagement and perceptions of curriculum relevance. The teacher is depicted as a facilitator of student learning, evident in the way that the objectives are written.

Integration of indigenous perspectives

One of the three cross-curriculum priorities of the AC is Aboriginal and Torres Strait Islander Histories and Cultures; the material is designed to be taught through learning areas.

In Finland, there is a strong commitment to provide educational opportunities for the Sámi and Roma populations, particularly in terms of delivering the curriculum in their languages.

Competency-based learning

The AC is committed to preparing students for life and work in the 21st century and a set of seven General Capabilities is provided to enable this.

Finland's equivalent, a set of seven Transversal Competences, is embedded in all subjects. Finland delivers a '21st century curriculum', wherein the traditional academic disciplines sit alongside the transversal competences.

Student diversity

The design of the AC reflects the commitment to equity and diversity stated in the Melbourne Declaration on Educational Goals for Young Australians (2008), with all students, regardless of their background or location, "entitled to rigorous, relevant and engaging learning programs" that address their cognitive, affective, physical, social and aesthetic needs (ACARA, 2015). The diversity of Australian students is acknowledged in the provision of advice materials that guide teachers in personalising the curriculum.

The FNCC is committed to equity and equality. A fundamental value is that each student is unique and has a right to a high-quality education, irrespective of his or her background, race, location and religion. Students are "heard, valued and encouraged" (Ministry of Education and Culture, 2016); according to a former Finnish Director-General of Education, "Every child has some special needs" (Sahlberg, 2018).

Plurilingual learning environment

Australian educators are encouraged to support students from diverse linguistic and cultural backgrounds and the AC: L includes both language-specific curricula and frameworks for

Aboriginal and Torres Strait Islander languages as well as classical languages. While numerous national and state/territory policies have emphasised the cognitive, literacy, nation-building and career benefits of foreign language acquisition, the provision of high-quality programs remains problematic and the proportion of school leavers studying a foreign language is extremely low by comparison with the high-performing nations that are the focus of ACARA's studies.

Plurilingualism is a distinctive feature of the Finnish education system, regarded as key to the personal and professional development of individuals and perceived as one of the competitive advantages in students' international performance. A summary of the country's longstanding approach to curriculum design in this field concludes that "the official language policy aims at maintaining and cultivating as many foreign languages as possible for individual cultural richness and for increasing national linguistic capital" (Buchberger, 2002, p. 199).

National assessment and reporting

Australia's national curriculum is complemented by the administration of an annual national assessment program that measures the performance of students in Years 3, 5, 7 and 9 in literacy and numeracy. Sample groups of students are tested in Science Literacy, Information Communication Technology (ICT) and Civics and Citizenship.

In Finland, national testing is sample-based and diagnostic, intended to gauge national learning outcomes. A national matriculation examination occurs at the end of upper secondary education, consisting of four compulsory tests in the mother tongue and the student's choice of three other subjects, generally including the second national language, a foreign language, Mathematics and general studies such as humanities and the natural sciences.

This comparative study considers the design and content of curricula from both countries that are arguably more similar than different in their aspirations for their young learners. The detailed analyses of the various learning areas and other dimensions show that the two curricula also share the reality that a school curriculum represents just one – albeit critical – element of the learning experience of a student in the 21st century.

1 PROGRAM OF RESEARCH

A very visible trend in education is the focus on redesigning school curricula to enable students to prepare for work and life in the 21st century.

School authorities and other decision-makers are encouraging innovative review of what students should learn and how the learning should occur, with input sought from a wide range of stakeholders, including parent and professional associations, industry and employer bodies and a range of special-interest groups. Amid escalating interest in international comparisons of the performance of education systems over past decades, nations and jurisdictions increasingly aspire to the creation and delivery of curricula that merit the description of “world-class” (Donnelly & Wiltshire, 2014; Denman & Higuchi, 2013; Hebert, 2012; Schleicher, 2009).

In Australia, discussions about curriculum content and design are frequently framed by perceptions of a decline in traditional academic standards, including student performance in national and international testing regimes. Concerns are expressed about school and sector funding and teacher quality. Much of this is accompanied by a sense of urgency to address issues of equity, access and diversity.

The AC, now being implemented in its first iteration, has a three-dimensional structure that attracts international interest regarding its capacity to meet the needs of all learners in an increasingly challenging world.

ACARA is undertaking a program of research that considers international trends and developments in curriculum design, including the projects to which Australia contributes, such as the OECD Education 2030 Project and the International Bureau of Education-United Nations Educational, Scientific and Cultural Organisation (IBE-UNESCO) Global Curriculum Network. The question guiding ACARA’s program of research is universal: *What should students learn?*

1.1 Background

With regard to the AC, ACARA’s strategic directions, endorsed by the COAG Education Council in November 2016, are to:

- Provide a world-class curriculum from Foundation to Year 12 in specified learning areas agreed to by Council
- Assemble the evidence base required to review, develop and refine curriculum.

ACARA’s quadrennial work plan (2016/17 to 2019/20) approved by Education Council in 2015 includes development of a program of research to review and report on recent developments in international curriculum practice to inform national policy and practice and to improve the AC.

1.2 Methodology

Comparative education research has a lengthy and wide-ranging history. A review of the literature (ACARA, 2017a) in the field of international comparative studies reveals a shift in emphasis from large-scale quantitative data analyses to more nuanced qualitative research methods and underpins the methodological choices made in this program of research. Over

the past thirty years, according to Epstein (2008, p. 377), two opposing epistemologies have characterised comparative education research, which he names as “the universalism of positivism and the particularism of relativism”. A consensus appears to be building among contemporary researchers that a mixed-methods approach to comparative studies is more likely to allow “more comprehensive analysis of the external and internal factors that shape policy making and education systems” (Chong & Graham, 2013, p. 2).

This international comparative study uses a mixed-methods research design incorporating philosophical and pedagogical assumptions as well as methods of inquiry. As a methodology, it draws on philosophical assumptions that guide the direction of the collection and analysis of data and the mix of qualitative and quantitative data in a series of studies. It seeks to use quantitative and qualitative approaches in combination to provide a better understanding of the research objectives (Creswell & Plano Clark, 2007, p. 5).

The study comprises ten smaller studies that compare learning/subject areas and other dimensions of the AC and the FNCC.

Learning areas applicable to the two curricula were counted in the study, as shown in Table 1.1. For this particular comparative study, however, a comparison for The Arts was not undertaken.

Table 1. 1 *Subject areas by country*

Australian Curriculum	Finnish National Core Curriculum
English	Mother Tongue and Literature
Mathematics	Mathematics
Science	Environmental Studies (Grades 1-6); Biology, Chemistry, Physics (Grades 7-9)
Humanities and Social Sciences (History, Geography, Civics and Citizenship, Economics and Business Year 10 only)	Social Studies, History, Geography (Grades 7-9 only)
Design and Technologies; Digital Technologies	Crafts; Environmental Education
Health and Physical Education	Physical Education; Health Education (Grades 7-9 only)
Languages (Italian)	Foreign Languages (English)
NOTE: As a point of departure, Finland offers Religion, Ethics and Guidance Counselling across Grades 1-9. Since the AC does not have a comparable knowledge base, a comparative analysis was not attempted.	

This comparative study includes an evaluation of the AC’s General Capabilities and Finland’s equivalent, the Transversal Competences.

A separate section considers the AC’s cross-curriculum priority of Aboriginal and Torres Strait Islander Histories and Cultures in comparison to Finnish strategies for meeting the educational needs of the Sámi people, taking into account the United Nations Declaration on the Rights of Indigenous Peoples.

This comparative study also includes a section on Student Diversity, considering issues of inclusivity and accessibility for a diverse range of students.

ACARA’s Curriculum Specialists undertook the comparisons of the learning areas and other dimensions of the curriculum.

Methodological Tensions and Measurement

Determining curricular breadth and depth is integral to curriculum design and this has been the source of “premature polarities” (Hirsch, 2001a,b). Hirsch also posits that a deep understanding depends on broad knowledge, emphasising that “not just any knowledge will suffice”. In determining breadth and depth, a curriculum is likely to privilege one over the other.

The aim of this study is to make comparisons between the AC and the comparison curriculum with respect to breadth, depth and rigour. The study uses a three-level taxonomy to determine curricular breadth and depth. The terminology used to describe curricular breadth and depth is informed by the National Highway Traffic Safety Administration: National Emergency Medical Services Education Standards (2009) and Masters (2015).

Calculating Breadth and Depth

Breadth refers to the number or range of topics or content covered in the curriculum. The terminology used to describe breadth is *limited*, *fundamental* and *comprehensive*.

Breadth	
Terminology	Explanation
Limited	Elementary, modest, unembellished
Fundamental	Building on basic breadth to expand knowledge
Comprehensive	Comprising multiple items; wide scope; full range

Depth refers to the amount or level of detail about a body of knowledge or topic that can lead to the development of deep understandings of key concepts, principles and knowledge and the ability to apply these understandings to authentic, or ‘real-world’, contexts. The terms used to describe depth are *limited*, *fundamental* and *challenging*.

Depth	
Terminology	Explanation
Limited	Elementary, rudimentary
Fundamental	A leading or primary principle, which is fundamental to system/body of knowledge; essential part
Challenging	Integrates, interconnects; a composite of knowledge; requires higher-order thinking

Calculating Cognitive Demand

Following the broad acceptance of Bloom's (1956) work, various attempts at developing schemas to describe cognitive demand in different learning and assessment contexts have included the National Assessment Governing Board's National Assessment of Educational Progress (NAEP) (2005) frameworks for assessing mathematical complexity of items based on demand on thinking and Norman Webb's *Depth of Knowledge* (1997).

Webb's tool is designed to help teachers create rich environments where all students can learn at a high level. Depth of Knowledge (DoK) categorises tasks according to the complexity of thinking required to successfully complete them.

Level 1: Recall and Reproduction

At this level, a student exerts little cognitive effort beyond recall or memorisation. Typical tasks are: copying, computing, defining, and recognising.

Level 2: Skills and Concepts

At this level, a student makes some decisions about learning. Typical tasks are: comparing, organising, summarising, predicting, and estimating.

Level 3: Strategic Thinking

At this level of complexity, a student uses planning and evidence, justifies choices and thinking is more abstract. Typical tasks involve solving non-routine problems, designing an experiment, or analysing characteristics of a genre.

Level 4: Extended Thinking

This level requires the most complex cognitive effort. A student synthesises information from multiple sources, often over an extended period, or transfers knowledge from one domain to solve problems in another. Examples might include designing a survey and interpreting the results, analysing multiple texts to extract themes, or writing a sophisticated, original text.

It must be noted that:

- levels are *not* considered a progression
- levels are *not* sequential
- levels are *not* developmental.

Webb's (1999) work has been applied mainly to different content areas and test item development in the United States, as well as being used in the determination of alignment between state standards and tests used for purposes of accountability.

Measuring Rigour

For the purposes of this comparative study, an understanding of **rigour** assumes the following:

- standards and expectations are high and known to all students
- assessments are comprehensive and aligned to learning standards
- focus is both on content and higher order activities
- student work is assessed both by the classroom teacher and external experts.

The schema provided in Figure 1.1 is based on Webb's *Depth of Knowledge* (1997). It provides a common language and shared methodology to make evidence-based and on-balance judgements about the level of rigour in the AC and any comparison curriculum.

With consideration of rating scales used in similar work, the schema employs a three-point scale to measure a curriculum's capacity to:

1. engender in-depth (mastery) learning across the years of schooling in a coherent and sequential manner, and
2. provide opportunities for cognitive and intellectual challenge that moves students into deeper and broader engagement with a learning area.

At *limited, moderate* or *challenging* levels, a curriculum will reflect:

- content knowledge and skills a student is expected to demonstrate (equivalent to Content Descriptions/Elaborations; Achievement or Learning Standards)
- cognitive demand placed on the student by the curriculum to accomplish tasks (equivalent to Creative and Critical Thinking).

The schema should not be considered a progression. Rather, it is a framework for gauging: (1) a student's depth of understanding of the content, including acquisition of skills aligned to the expectations of a jurisdiction's curriculum, and (2) the level or variance of cognitive demand placed on a student by the curriculum learning area.

Limited	Moderate	Challenging
Relies on memorisation and recall (e.g. recognition of previously learned concepts and principles)	Involves flexibility of thinking and choice in developing skills and concepts (e.g. comparing, applying, classifying, describing, explaining)	Places considerable demand on students' ability to engage in abstract thinking and reasoning (research, planning, analysis, investigation, use of judgement, application of critical, creative and collaborative skills to solve problems and apply solutions to real-world issues)
Teacher actions		
Questions to direct or focus attention; shows/tells/demonstrates; provides examples; examines; leads, breaks down (deconstructs); defines	Questions to differentiate, infer, or check conceptual understanding; models; organises/reorganises/explores possible options or connections; provides examples	Questions to probe reasoning and underlying thinking; asks open-ended questions; acts as resource/coach; provides criteria and examples for making judgements and supporting claims; encourages multiple approaches and solutions
Student actions		
Responds, remembers, memorises, restates, absorbs, describes, demonstrates, follows directions, applies routine processes, definitions, procedures	Solves routine problems/tasks involving multiple decision points and concepts; constructs models to show relationships; demonstrates use of conceptual knowledge; compiles and organises; illustrates/explains with examples /models	Uncovers and selects relevant and credible supporting evidence; analyses, critiques, debates, judgements; plans, initiates questions, disputes, argues, tests ideas/solutions; sustains inquiry into topics or deeper problems
Examples of student product		
Show and tell Locate or recall quotes Document information/cite sources Brainstorm related ideas Represent math relationships in words, pictures, or symbols Write complete sentences Fill-in-the-blank tasks Recite math facts, poems, etc	Graphic organiser Mind map Blog entries Timeline Demonstration (e.g. sports) Diary entry (English, Art) Narrative writing Spreadsheet Survey development Science/Mathematics logs Venn diagram	Complex graphing Vodcast or podcast Analyse survey results Debate/argue from given perspective, Multiple paragraph essay or extended response, including research and analysis Literary critique, play, book, music or film review, Information report (may be multimodal), Science experiment report (may be multimodal), Storyboard for film/cartoon animation

Source: Hess, K. (2013). *A Guide for Using Webb's Depth of Knowledge with Common Core State Standards*. Common Core Institute.

Figure 1. 1 Webb's Depth of Knowledge (1997)

Based on this schema, a template was developed to map curricular *breadth*, *depth* and *rigour*, as can be seen in the smaller studies included in this paper, enabling judgements about the seven learning areas and three other dimensions of the comparison curricula.

2 CONTEXTUAL DESCRIPTION AND ANALYSIS

2.1 Preamble

As education systems around the world grapple with the challenge of preparing students for work and life in the 21st century, their efforts have invariably led to consideration of curriculum at the system and/or school level. They have also, according to Fadel (2014), generally resulted in making existing curricula more robust and rigorous rather than redesigning learning in innovative, skills-based ways.

Fadel's (2014) assertion, mirrored in the research underlying the OECD's Education 2030 Project, is that the rapid rise in the rate of global systemic change has created "an increasingly volatile, uncertain, complex, ambiguous (VUCA) world and thus is significantly more unpredictable". For students to function successfully in a rapidly changing world, it is now recognised that they will need to be able to "find solutions to complex social and environmental problems". It follows that they will need to "develop higher-order thinking skills, social intelligence, the ability to work with diverse groups of people and a commitment to lifelong learning", according to PricewaterhouseCoopers Consulting (Australia) (2017).

The UNESCO Global Curriculum Network (GCN) project pursues similar lines of investigation into educational developments and practices around the world. A recently released discussion paper argues for a new approach to curriculum design (UNESCO, 2017), exploring the view that rethinking and repositioning curriculum in the 21st century demands a global change in basic assumptions. The discussion seeks to redefine curriculum as a multi-modal, multi-dimensional and complex continuum that must take account of a fourth industrial revolution; that is, students are learning in a world that is rapidly shifting from a focus on the acquisition of knowledge to one that is driven by access to and the use of technology to enable the application of knowledge.

In this view, the traditional, triangulated relationship between teaching, learning and assessment represents a limiting and limited proposition. Future curriculum design must be shaped and informed by a proactive objective, where curriculum is "an agent of change rather than just a reactor to change" (UNESCO, 2017, p 4).

Australian research supports the notion that a 21st century curriculum should encourage students to prepare for post-school lives that are likely to span a range of occupations, many of which do not yet exist (Masters, 2015). Such a curriculum should privilege:

- deep understandings of subject matter and the ability to apply what is learnt
- the ability to communicate and solve problems in teams
- the ability to think critically and to create novel solutions
- flexibility, openness to change and a willingness to learn continually (Masters, 2015).

Consistent with OECD research on 21st century skills, Masters (2015) posits that an effective school curriculum prioritises depth over breadth of learning.

What is the appropriate balance between breadth and depth? International research evidence suggests that school curriculum tends to be ‘crowded’ with content that teachers are expected to cover. This is a major focus of the OECD Education 2030 Project, as researchers and educators attempt to address the concerns coming from the field regarding the density of content and the temptation among teachers to ‘tick off’ items they have taught rather than aspire to providing students with deep learning in fewer areas (Masters, 2015). Efforts to provide students with some knowledge about a wide range of topics can lead to what is sometimes referred to as ‘mile-wide, inch-deep’ curriculum. The current paradigm in schools privileges mastery of factual and procedural knowledge in the disciplines.

The OECD Education 2030 Project, in its efforts to rethink curriculum design, argues that future-ready learners will need to be able to combine knowledge, skills, attitudes and values in specific contexts for their learning to have value and positive impact. This implies a redefinition of the scope of knowledge and skills to reflect deeper understanding and broader application. 21st century learners need knowledge that is “discipline-based, inter-disciplinary, epistemic, and procedural”. They also require skills that are “cognitive and meta-cognitive, social and emotional, practical and physical” (OECD, 2017c).

Over the last decade, Australia and Finland have both engaged in an extensive review of curriculum, consulting with stakeholders and engaging with national and international experts.

Australia has developed its first truly national curriculum, a three-dimensional model that identifies learning areas and subject disciplines, general capabilities and cross-curriculum priorities.

Finland's new curriculum model is also a national curriculum built on knowledge, skills and values, and a specific set of ‘transversal competences’ that help learners to use their knowledge, skills, attitudes and values to navigate a 21st century landscape. It is less prescriptive with respect to learning content than its counterparts around the world, including the AC.

2.2 Demographic comparison: Australia and Finland

No other country has so little variation in outcomes between schools, and the gap within schools between the top and bottom-achieving students is extraordinarily modest as well. Finnish schools seem to serve all students well, regardless of family background or socio-economic status. (OECD, 2010, p. 118)

This section provides broad demographic information to assist in understanding the context of curriculum development in Finland and Australia.

Finland’s education system has attracted increasing interest, primarily since the participation of 41 countries in the OECD 2003 Programme for International Student Assessment (PISA) saw Finland ranked first in Science and reading, and second in Mathematics (OECD, 2004).

In addition to their students’ consistent performance above OECD averages in international assessments, Australia and Finland are similar in other ways. Both are modern, Western nations, operating as representative democracies. Both became sovereign nations in the early years of the twentieth century, the Australian Constitution Act passed by the British

Parliament in 1901 and Finland declaring independence from Russia in 1917. Australia is a federation, comprising six states and two territories, whereas Finland is a unitary state where the President is the head of state and the Prime Minister is the head of government. Australia, adhering to a Westminster-style system, has a Prime Minister as head of government and the Governor-General as the head of state, representing the British monarch.

The two countries have different funding models for education. In Finland, responsibility for funding is shared between the Finnish national government and the local authorities or municipalities, who are also responsible for the oversight of schools. The Ministry of Education and Culture is responsible for developing national goals and policy decisions that guide and inform the curriculum for compulsory basic education (Grades 1-9), and the FNBE is responsible for the implementation of its policy aims. Over 300 local or joint municipal authorities are responsible for funding schools and drawing up local curricula based on the national framework (Sahlberg, 2015).

There are no tuition fees for compulsory education in Finland schools (FNAE, 2017a) including faith-based or Rudolf Steiner schools. This can be compared with Australia's system where almost 35% of students are enrolled in private, fee-paying schools, either Catholic or Independent (Australian Bureau of Statistics (ABS), 2017).

The Australian Government Department of Education and Training (AGDET) is responsible for national policies and programs that help Australians access quality and affordable early child care and childhood education, school education, higher education, vocational education and training, international education and research. The AGDET provides over half of total funding in the Catholic school sector and almost a third of total funding in the Independent school sector. The six state and two territory governments have constitutional responsibility for funding the majority of government schools and for making decisions regarding the implementation of curriculum.

ACARA, an independent statutory authority, is responsible for the development of a national curriculum, a national assessment program, and a national data collection and reporting program that supports learning for Australian students. Whereas the Australian National Assessment Program for Literacy and Numeracy (NAPLAN) is conducted annually in schools throughout the country, the progress of Finnish students is monitored through sampling and the results are used by schools to support development and improvement. These results are not made public. The only national testing is for matriculation at the end of secondary school.

Population

Australia is a large country in the southern hemisphere, ranking sixth in the world in terms of land mass and containing a very small population. Finland, situated in northern Europe, has a much higher population density, with an average of just over 18 people per square kilometre, compared with Australia's average of three people per square kilometre. Table 2.1 provides details of population growth relative to both countries.

Most Finns live in the southern regions of Finland; half of the population lives south of the Rauma-Imatra line (Statistics Finland, 2016) and only 29% live in predominantly urban areas

(OECD, 2016a, p. 1). Finland calculates the urbanisation index at 69.4% (Statistics Finland, 2015). However, one-half of areas defined as ‘urban settlements’ only support 200 to 999 inhabitants. Individual Finnish municipalities are likely to experience less variation in enrolment numbers within their portfolio of schools than the Australian states and territories, particularly in rural and regional areas. The municipalities average around 17,000 inhabitants, ranging from around 630,000 in Helsinki to fewer than 500 in smaller municipalities (Statistics Finland, 2016).

In Australia, which is almost 23 times the size of Finland, 82% of the population resides in Greater Capital City areas (ABS, 2017b). A high geographical concentration is seen on the continent's south-east coast, particularly as the population continues to gravitate towards large metropolitan areas.

Table 2. 1 *Key population measures*

Demographic measure	Australia	Finland
Population	24,385,600 ¹	5,503,297 ²
Area (km ²)	7,692,024	303,815
Average people per square kilometre	3.17	18.11
Average annual population growth 2016	1.6% ¹	0.3% ²
% of population living in Greater Capital Cities (Aust) ³ / Urban areas (Finland) ⁴	82%	29%

Based on and includes information from the following sources:

1 Source: Australian Bureau of Statistics, Australian Demographic Statistics (3101.0, Dec 2016, released 27 June 2017) ©

2 Source: Official Statistics of Finland, Population structure 31 December, www.stat.fi/tup/suoluk/suoluk_vaesto_en.html ★

3 Source: Australian Bureau of Statistics, Regional Population Growth, Australia 2015-16 Australian Demographic Statistics (3218.0, released 30 March 2017) ©

4 Source: OECD Regional Outlook 2016 Finland, IV. Country Notes

Economy

Australia's Gross Domestic Product (GDP) continues to grow well in excess of the OECD average and it is expected to increase at almost twice the rate of Finland in 2018 (OECD, 2017a). In terms of GDP per capita, Australia enjoys a 10% premium over Finland. Table 2.2 provides details of GDP and expenditure on education, relative to the OECD average.

© Based on Australian Bureau of Statistics data

★ Based on and includes Statistics Finland's data licensed under the Creative Commons Attribution 4.0 International Licence.

Table 2. 2 Key economic measures

Economic measure	Australia	Finland	OECD Average
GDP (USD billion) forecast 2016 ¹	1,251	239.66	(ABS, 2017a) n/a
GDP (USD) per capita 2016 ²	\$47,770	\$43,363	\$42,013
% GDP growth 2016 ³	2.44%	1.39%	1.78%
% GDP spent on education ⁴	5.6%	5.7%	5.2%
Primary education	1.8%	1.3%	1.5%
Secondary education	2.0%	2.6%	2.2%
Average \$ spent per student 2013 (USD) ⁵			
Primary education	8,289	8,519	8,477
Secondary education	10,932	10,237	9,811

Based on and includes information from the following sources:

1 Source: International Monetary Fund, GDP based on purchasing power parity(PPP)

2 Source: OECD Data, Gross domestic product (GDP) per capita (<https://data.oecd.org/gdp/gross-domestic-product-gdp.htm>)

3 Source: OECD Data, Real GDP forecast (<https://data.oecd.org/gdp/real-gdp-forecast.htm>), accessed September 20, 2017

4 Source: OECD Education at a Glance 2016: OECD Indicators, Table B2.1

5 Source: OECD Education at a Glance 2016: OECD Indicators, Table B1.1

The two nations spend approximately the same proportion of GDP on education, with 5.6% spent in Australia and 5.7% in Finland, compared with 5.2% for the OECD average. However, the relative expenditure across sectors differs, with Finland spending more in the secondary sector.

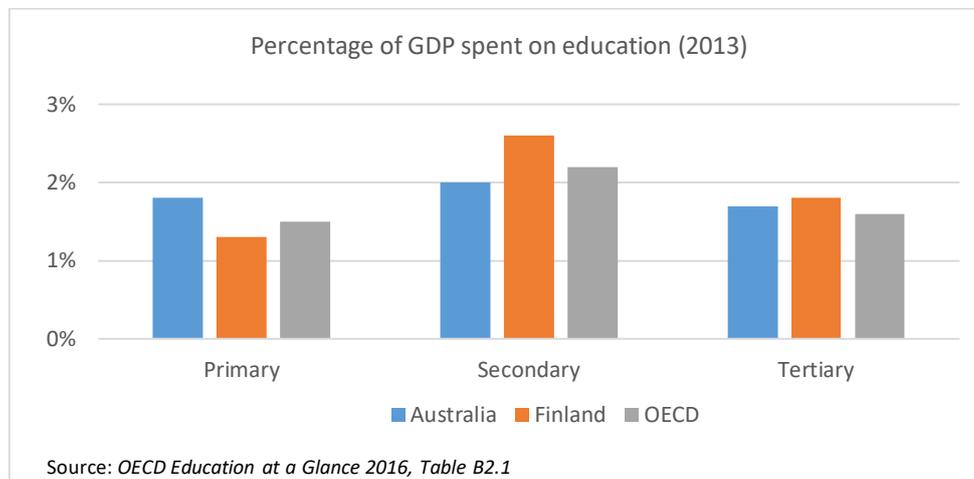


Figure 2. 1 Percentage of GDP spent on education

As the average expenditure on primary students is relatively lower in Australia than in Finland (see Figure 2.1), but the percentage of GDP spent in the primary school sector is much higher, it could be concluded that Australia has a much higher population growth in primary-aged children than Finland. This aligns with Table 2.1, which shows that the rate of overall population growth in Australia in 2016 was around five times that of Finland. The percentage of the population aged 0-14 years old was 18.8% in 2016 for Australia (OECD, 2016a), compared with 16.2% for Finland (Statistics Finland, 2017a).

This rate of population growth in Australia is a major factor, along with wage inflation, in the 24% overall increase (AUD 34.9b to AUD 43.1b) in school education expenditure between 2005/6 and 2014/15 (O'Connell & Torij, 2016).

Indigenous population

In Australia, almost 3% of the population identifies as Indigenous (Aboriginal or Torres Strait Islander) whereas the Sámi peoples of Finland numbered 9,350 in 2009, or less than 0.2% of the population (Finnish Parliament: Eduskunta, 2009). The small size of the latter population in absolute number terms means that detailed performance data for the Sámi student population are not captured.

Students with special needs

In Finland, special needs education is generally provided in conjunction with mainstream education. School-aged students are supported in ways that allow them to complete their compulsory education and become eligible for upper secondary education (FNAE, 2017b).

Australian students have the right to participate in education programs on the same basis as any other students, and they are supported by schools in line with the Disability Discrimination Act (1992) and the AGDET Disability Standards for Education (2005). Each state and territory makes provision for students with special needs in consultation with schools and sectors.

Instruction time and class size

Finland and Australia differ in their allocation of instruction time in compulsory general education. Australian students record the highest number of hours of instruction time of any country in the OECD for primary and lower secondary education. The total number of hours for an Australian student in primary and lower secondary schooling is 11,000 hours. This is almost 74% more time than is allocated in Finland, where the allocation is lower than the OECD average.

Finnish teachers record around 100 hours less teaching time per year than the OECD average for each level of education, and around 200+ hours less per year than is offered in Australian schools. By contrast, Australia's student-teacher ratio is higher than that of Finland and the OECD average, and the average class size is also much larger, as shown in Table 2.3.

Table 2. 3 Key teaching measures

Teaching measure	Australia	Finland	OECD average
Ratio of students to teaching staff ¹			
- Primary education	16	13	15
- Secondary education	16	13	13
Average class size ²			
- Primary education	24	19	21
- Lower Secondary education	24	20	23
Compulsory hours in primary and lower secondary ³	11,000	6,327	7,540
Average teaching time (hours) ⁴			
- Primary education	872	673	776
- Lower Secondary	812	589	694
- Upper Secondary	804	547	644

Based on and includes information from the following sources:

1 Source: *OECD Education at a Glance 2016: OECD Indicators, Table D2.2 Ratio of students to teaching staff in educational institutions (2015)*.

2 Source: *OECD Education at a Glance 2016: OECD Indicators, Table D2.1 Average class size by type of institution (2015)*.

3 Source: *OECD Education at a Glance 2016: OECD Indicators, Table D1.1 Instruction time in compulsory general education (2017)*.

4 Source: *OECD Education at a Glance 2016: OECD Indicators, Table D4.1 Organisation of teachers' working time (2015)*.

Although Finnish teachers require a postgraduate degree (FNAE, 2017c) they are paid less than their Australian counterparts. The salaries of Finnish teachers are also lower than the OECD average for experienced teachers, as shown in Figure 2.2.

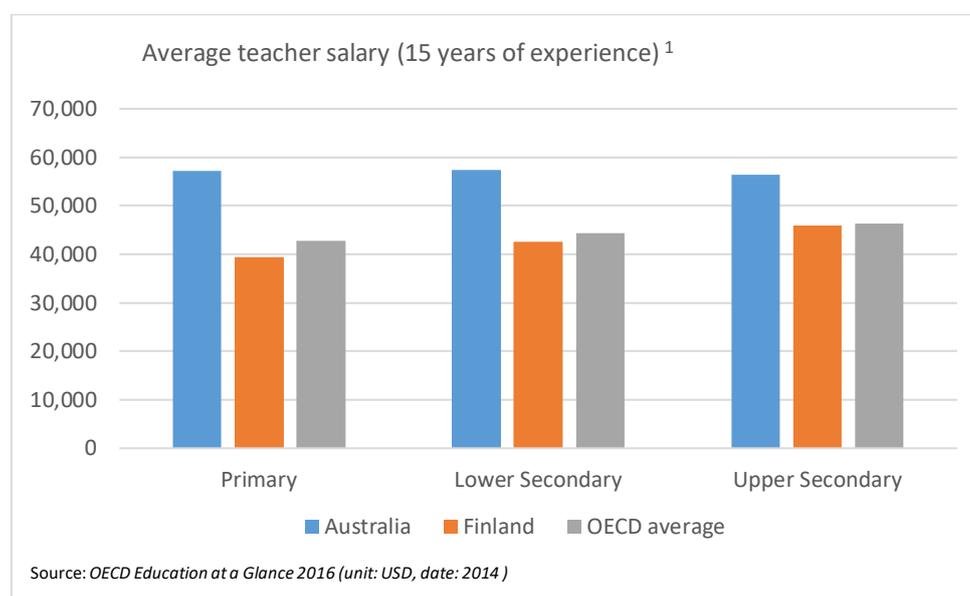


Figure 2. 2 Salary of experienced teachers

Finland pays upper secondary teachers more than lower secondary teachers, and the latter are paid more than primary teachers. This trend appears in the OECD average as well, although the increment between levels is around 8% for Finland and 4-5% for the OECD average.

Relative to the salaries of other tertiary-qualified workers in Finland, Finnish teachers are paid well. Whereas Australian teachers are paid around 85% of the salary of the average tertiary-

educated worker in Australia, primary school teachers in Finland earn around 89% of the average tertiary-educated worker in that country, rising to 98% for lower secondary teachers and 110% for teachers at upper secondary level (OECD, 2016a, p. 422).

As per Figure 2.3, OECD data collected on the average age of principals employed in lower secondary schools show that Australia has a higher weighting of older principals in this category than Finland. The percentage of female principals is also slightly higher in Finland, at 40.6% versus 38.6% in Australia (OECD, 2016a, p. 460).

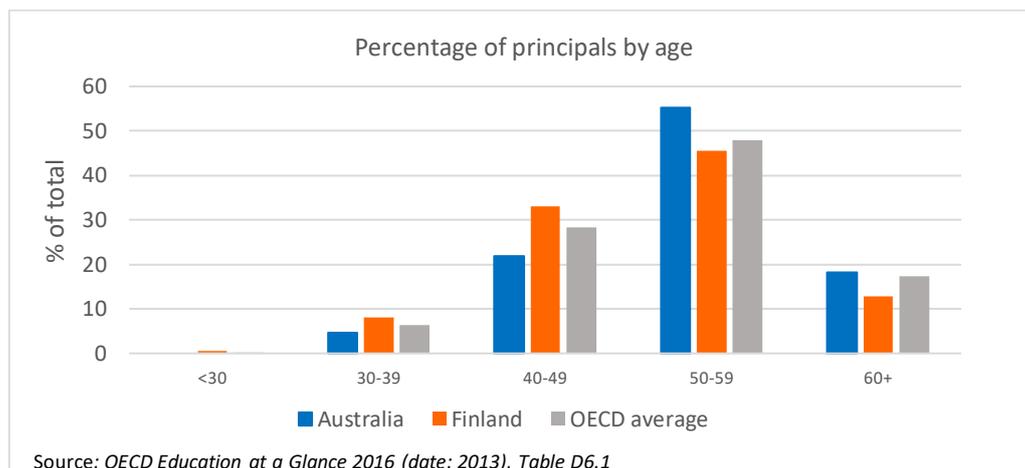


Figure 2. 3 Percentage of principals by age

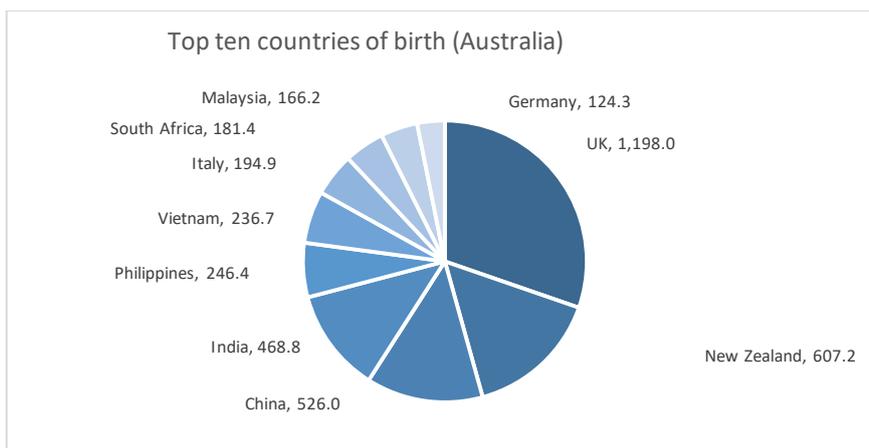
Migration

Population

Finland reports record levels of immigration – up 21% in 2016 from the previous year and representing a doubling of the numbers of 15 years ago. However, absolute numbers are still quite low, at almost 35,000 or 0.6% of the current population (Statistics Finland, 2017b).

At 5.6%, the percentage of foreign-born people living in Finland is low by OECD standards, whereas Australia has the third highest percentage, at 28.5% (ABS, 2017b; OECD, 2017b). Finland is one of a group of countries that has accepted a large number of humanitarian immigrants since 2000 and developed strong integration policies (OECD, 2016b).

In Australia, the most common country of birth for the overseas-born population is the United Kingdom, followed by New Zealand, China and India as shown in Figure 2.4.



Based on and includes information from the following source:
 Source: ABS 3412.0 Migration, Australia, 2015-16 (unit: thousands)

Figure 2. 4 Country of birth (Australia) [©]

Most immigrants resident in Finland in 2016 came from EU countries (12,093 people). The most common sources of migrants from non-EU countries were Iraq, Russia and Afghanistan (Statistics Finland, 2017b). Education providers organise preparatory education for migrants to enable them to enter basic or upper secondary education.

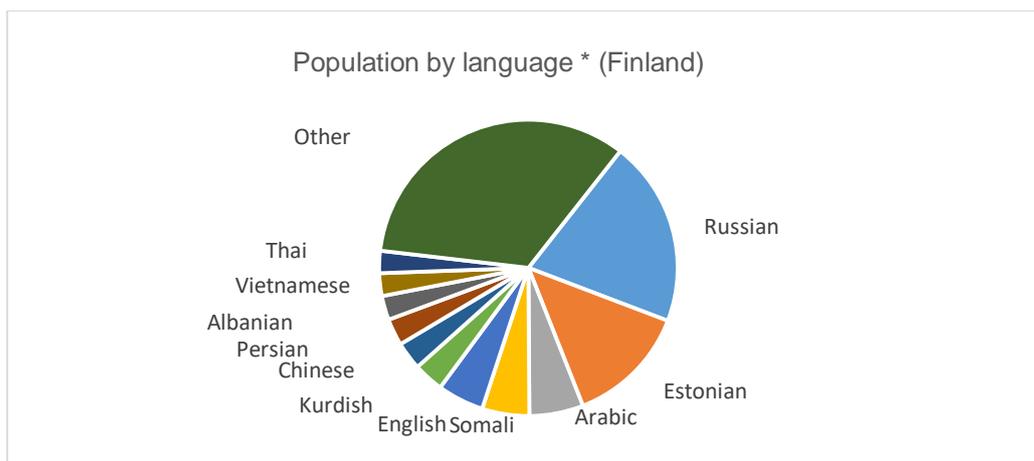
The high level of migration in Australia, particularly refugees from non-English speaking backgrounds, means that significant English support is required (Wiseman & O'Gorman, 2017; Sharma, 2014). This is available through schools and community organisations.

Languages

Finland has two official languages: Finnish and Swedish. Approximately 88% of Finns speak Finnish as their native language, compared with 5.3% of the population whose native tongue is Swedish (Statistics Finland, 2017c). Approximately 5% of school-age children attend a school where Swedish is the language of instruction (Nuolijarvi, 2011).

The growing immigrant population is also reflected in the variety of languages spoken in the home. Foreign-language speakers represent 6.4% of the population. The most common language groups are Russian, Estonian and Arabic (Statistics Finland, 2017a) as shown in Figure 2.5.

[©] Based on Australian Bureau of Statistics data



Based on and includes information from the following source:

Source: *Statistics Finland Population by Language, 2016*

* excluding Finnish, Swedish and Sámi

Figure 2. 5 Population by Language (Finland) *

In the Sámi-speaking areas of Lapland, local authorities are required to provide education in one of the three Sámi languages. Sámi speakers represent 0.04% of the population (Statistics Finland, 2017d). It is possible to apply for funding for instruction in Sámi, Roma and other migrant languages, as well as sign language.

Notwithstanding its significant socio-cultural diversity, Australia is essentially a monolingual society in which the language of instruction in schools is English and access to foreign language instruction is variable. Around 20% of the Australian population can speak more than one language. According to the 2016 census, the most common languages spoken at home, other than English, are Mandarin, Arabic, Cantonese and Vietnamese (ABS, 2017c). Around 50 Indigenous languages are estimated to be in use, down from over 250 at the time of first European contact.

The AC provides a framework for Aboriginal and Torres Strait Islander Languages as well as curricula for 16 languages, both classical and modern (ACARA, 2017b).

In comparison, Finland's ministry-authorized languages curricula include English, French, German, Italian, Latin, Russian and Spanish (FNBE, 2016).

Educational achievement

The highest level of educational attainment in Australia is among students completing the upper secondary qualification. This is also the case in Finland and in most OECD countries.

In Australia and Finland, the percentage of the population holding tertiary qualifications has increased over time. In 2015, around 43% of the population of adults aged 25-64 in both countries held a tertiary-level qualification, exceeding the 36% average across the OECD

* Based on and includes Statistics Finland's data licensed under the Creative Commons Attribution 4.0 International Licence.

(see Figure 2.6). However, Australian tertiary attainment is greatest at undergraduate level, with 24% versus 15% in Finland. Finland has 14% of students completing degrees at Master level, versus 6% in Australia. In both countries, 1% of the population is educated to Doctorate level (OECD, 2016a, p. 41).

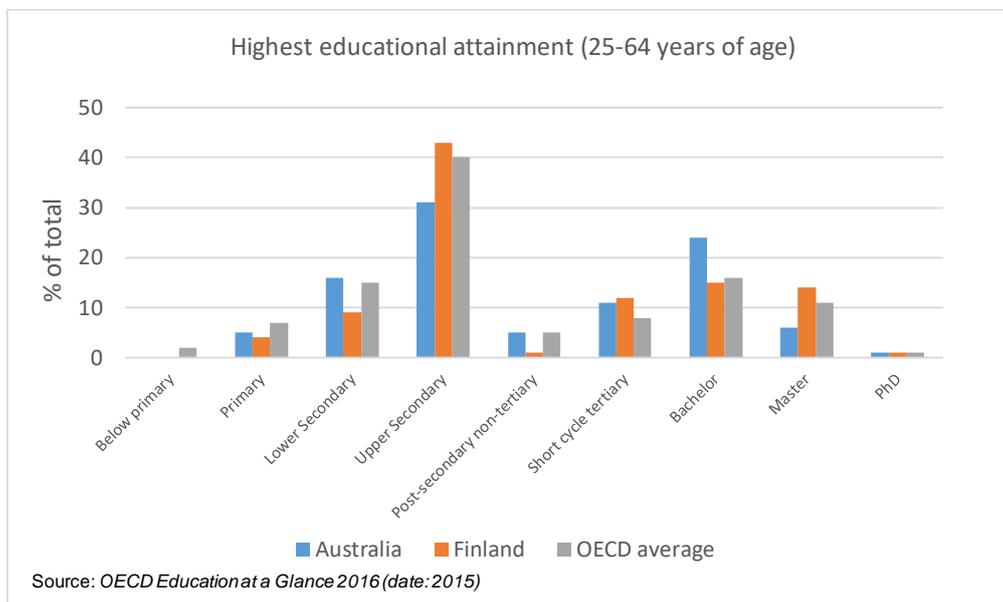


Figure 2. 6 Highest educational attainment (25-64 years of age)

As Figure 2.7 demonstrates, the proportion of Finnish and Australian adults pursuing certain areas of post-school study varies. Finland dominates in the number of Engineering, Manufacturing and Construction graduates, with 23% of graduates compared with 12% in Australia. Recent data also show that Finland has marginally more graduates in Health and Welfare (19% versus 16% in Australia) (OECD, 2016a, p. 45). However, Australian adults show stronger interest in social science, business and law degrees.

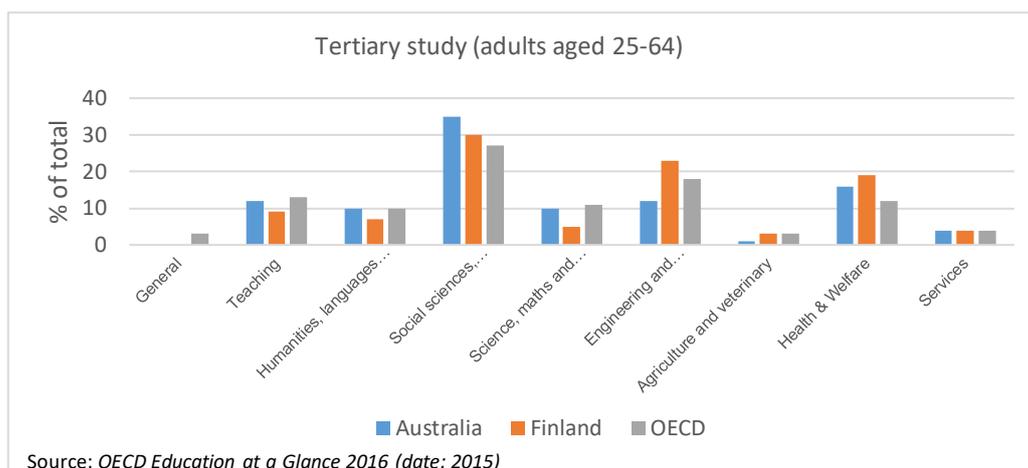


Figure 2. 7 Tertiary study (adults aged 25-64)

The gender split shows that there were 4.7 females for every male in the field of Education for Finnish graduates in 2014, compared with 3 females for every male in Australia (OECD, 2016a, p. 70). This aligns with the higher percentage of female principals in lower secondary school in Finland compared with Australia. Finland also reports a predominance of females in the fields of Humanities and the Arts; Social Sciences, Business and Law; and Health and Welfare.

In the Sciences, Finland reported 1.43 male graduates for every female in 2014, whereas Australia reported 1.67 males for every female (OECD, 2016a). Notably, Finland is the only country in the OECD that recorded significantly more girls than boys among the top performers in the Science Literacy results for PISA (OECD, 2016c, p. 17).

Post-education employment

In Australia and Finland, employment rates for adults aged 25-64 with upper secondary education as their highest educational attainment are 77% and 72%, respectively.

The improvement in employment rates for those people who go on to attain a post-secondary, non-tertiary qualification is extremely high in Finland, rising to 94% as opposed to 83% in Australia (OECD, 2016a, p. 103).

The employment of tertiary graduates demonstrates the value of additional qualifications across the OECD average and Finland, noting flatter incremental advantage in Australia.

Table 2. 4 *Employment by highest educational attainment*

Educational attainment	Australia	Finland	OECD average
Lower secondary	64%	59%	60%
Upper secondary	77%	72%	74%
Post-secondary, non-tertiary	83%	94%	79%
Bachelor	84%	82%	82%
Master	84%	85%	87%
Doctorate or equivalent	86%	88%	91%

Based on and includes information from the following source:

1 Source: *OECD Education at a Glance 2016: OECD Indicators (Table A5.1, year: 2015)* as a % of total at that level

As per Table 2.4, the OECD reports that 32% of adults aged 25-64 held tertiary qualifications in Australia in 2005; this figure rose to 43% in 2015 (OECD, 2016a, p. 43). In Finland, the proportion of tertiary-qualified adults rose from 35% to 43% over the same period.

Such increases may be linked to the youth unemployment rate which, as in many other countries, is significantly higher than unemployment rates for older Australians and Finns. Recent youth unemployment statistics show 12.7% youth unemployment in Australia compared to 20.1% in Finland (iEconomics, 2017). The Finnish youth unemployment rate has been consistently high over the last eight years (Eurostat - European Commission, 2017) which may also explain the much higher proportion of graduates with a master's qualification in Finland.

This trend is also supported by data reporting on the salaries of Finnish graduates holding a master's degree or doctoral qualifications in education studies. On average, Australians with a master's degree or doctorate earn 55% more than employees with an upper secondary education; in Finland this differential is 63%. At the undergraduate level, Australians earn around 39% more than those with an upper secondary education, whereas Finns see only a margin of about 21% (OECD, 2016a, p. 125).

Comparative International Performance

The Programme for International Student Assessment (PISA) is designed to provide policy-oriented international indicators of the skills and knowledge of 15-year-old students across the member countries of the OECD. Both Australia and Finland have participated in PISA since it was introduced in 2000.

PISA 2015 is the sixth cycle of PISA. It focused on scientific literacy, with mathematical and reading literacy as minor domains in this latest round. For the first time, PISA 2015 also included financial literacy and a collaborative problem-solving assessment for countries that elected to participate in computer-based delivery.

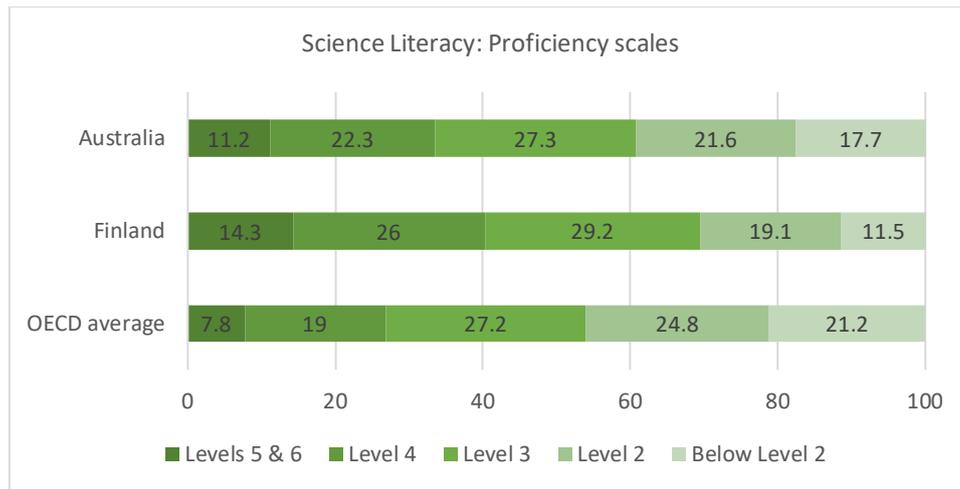
Finland was one of only seven countries where at least four out of five 15-year-old students demonstrated mastery of the baseline level of proficiency in all three literacies: Science, reading and Mathematics. The others were Canada, Estonia, Hong Kong (China), Japan, Macao (China) and Singapore (OECD, 2016d, p. 4).

Performance – Science Literacy

In the 2015 cycle of PISA, Finland was ranked 5th and Australia 14th in Science Literacy. This result represents a statistically significant decline for both countries compared with the prior cycle (OECD, 2016d, p. 5).

The analysis of achievement by male and female students revealed that Finland is the only OECD country where “there are significantly more girls than boys among the top performers” (OECD, 2016d, p. 78). This finding contrasts with other feedback that boys are more than four times as likely to expect a career as an engineer, scientist or architect (OECD, 2016c, p. 117).

In terms of the proficiency scales, 14.3% of Finland's cohort performed at the top of Level 5 and 6; this is almost double the OECD average and well above the Australian average (see Figure 2.8). It should be noted that Level 2 is considered the baseline level of proficiency in Science Literacy, and both Australia and Finland have recorded an increase in the number of students not attaining this level over the last three cycles of PISA Science Literacy testing (OECD, 2016c, p. 321).



Based on and includes information from the following source:

Source: OECD. (2016). *PISA 2015 results (Volume 1): Excellence and equity in education*. Figure 1.2.5 Students' proficiency in Science.

<http://dx.doi.org/10.1787/888933432072>

Figure 2. 8 Science Literacy: Proficiency scales

Australia's results show a large differential between the performance of the top 10% and bottom 10% of students, as demonstrated in Table 2.5, suggesting lower equity than in other OECD countries. A few countries have a wider spread of results than Australia, including New Zealand, Singapore, France and Israel (Institute of Education Sciences, 2016).

Table 2. 5 Performance in Science Literacy (PISA 2015)

Science Literacy	Australia	Finland	OECD average
Average score	510	531	493
Score difference between 10 th and 90 th percentiles ¹	267	249	247
% of immigrant students in PISA 2015 ²	25%	4%	12.5%
% of variation explained by students' socio-economic status ³	11.7%	10.0%	12.9%

Based on and includes information from the following sources:

1 Source: OECD, *PISA 2015 Results (Volume 1): Excellence and Equity in Education*, Table I.2.3 Mean scale and variation in science performance

2 Source: OECD, *PISA 2015 Results (Volume 1): Excellence and Equity in Education*, Table I.7.15a Change between 2006 and 2015 in the science performance gap related to immigrant background, and socio-economic status and language spoken at home

3 Source: OECD, *PISA 2015 Results (Volume 1): Excellence and Equity in Education*, Table I.6.17 Change between 2006 and 2015 in science performance and equity indicators

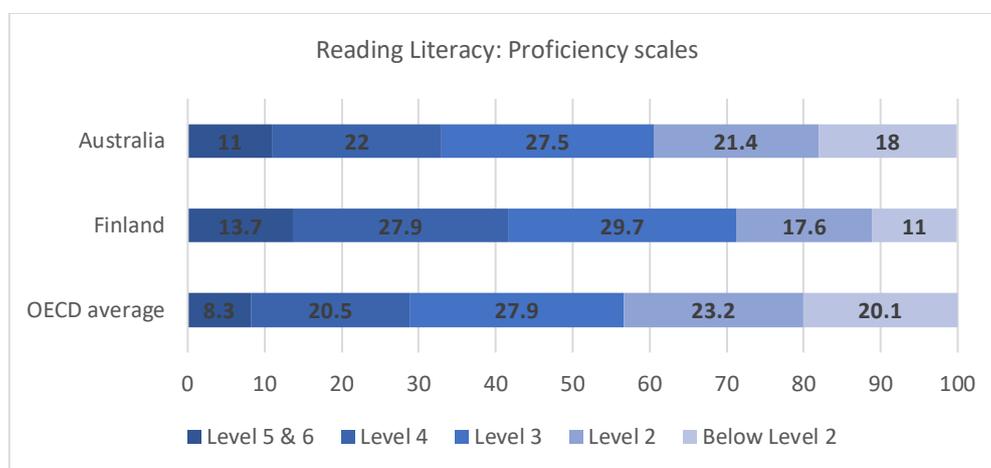
In Science Literacy, as per Table 2.5, there was no statistical difference between the performance of boys and girls in Australia, although boys performed worse in the 10th percentile and better in the 90th percentile, demonstrating a greater range of performance than girls. In Finland, girls performed better than boys at the 10th, 50th (median) and 90th percentiles (OECD, 2016c, p. 328).

In terms of performance over time, Australia lost 17 average points between 2006 and 2015, whereas Finland lost 33 average points over the same period, against an average OECD loss of 5 points (OECD, 2016c, p. 324).

Performance – Reading Literacy

Finland ranked 4th in Reading Literacy in 2015 compared to Australia’s 16th ranking. Both countries recorded a reduction in average performance since 2000. Girls in Australia and Finland performed better than boys at 10th, 50th (median) and 90th percentiles, although the performance differential was significantly more pronounced for Finland (OECD, 2016c, p. 384).

Figure 2.9 shows that Australia is close to the OECD average of 80%, with just under 82% of its students achieving the baseline of Level 2 in Reading Literacy. Nearly 89% of Finnish students achieved Level 2 proficiency.



Based on and includes information from the following sources:
 Source: OECD. (2016). *PISA 2015 results (Volume 1): Excellence and equity in education*. Figure 1.4.8 Students' proficiency in reading. <http://dx.doi.org/10.1787/888933432569>

Figure 2. 9 Reading Literacy: Proficiency scales

Australia’s results in Reading Literacy also showed a large differential between the performance of the top 10% and bottom 10% of students, as demonstrated in Table 2.6, suggesting lower equity than in other OECD countries. New Zealand, France and Israel were among the few countries that produced a greater spread of performance than Australia.

Table 2. 6 Performance in Reading Literacy (PISA 2015)

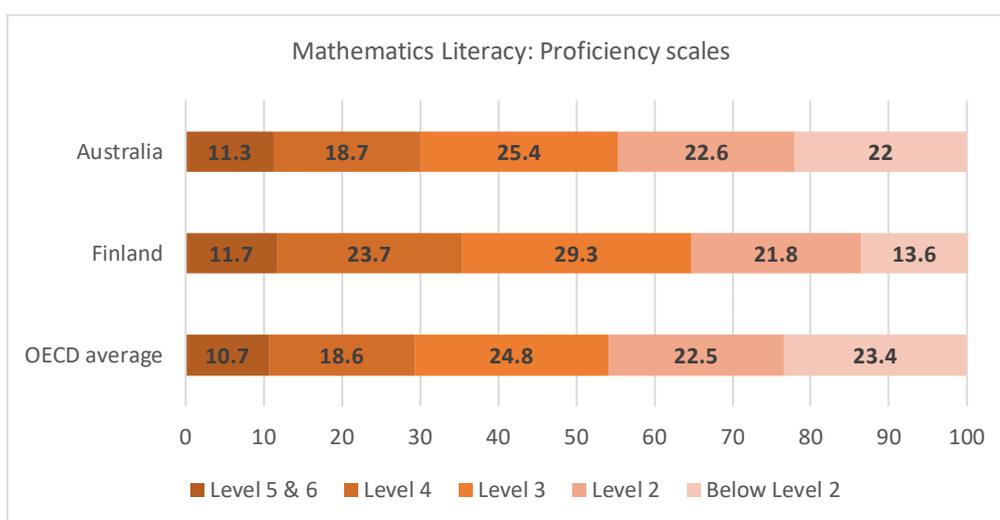
Reading Literacy	Australia	Finland	OECD average
Average	503	526	493
Point difference between 10 th and 90 th percentiles ¹	266	239	249

Based on and includes information from the following source:
 1 Source: OECD, *PISA 2015 Results (Volume 1): Excellence and Equity in Education*, Table I.4.3

Performance – Mathematical Literacy

In relation to Mathematics Literacy, Finland ranked 13th for 2015, compared with Australia's ranking of 25th. On average, Finnish girls performed marginally better than boys and at the lower percentiles but boys performed marginally better at the 90th percentile (617 versus 611). In Australia, boys scored higher than girls, except in the lower 10th percentile (OECD, 2016c, p. 395).

As per Figure 2.10, the baseline Level 2 in Mathematics Literacy was achieved by 86.4% of students in Finland, 78% in Australia and 76.6% across the OECD.



Based on and includes information from the following source:

Source: OECD. (2016). *PISA 2015 results (Volume 1): Excellence and equity in education. Figure 1.5.8 Students' proficiency in Mathematics.*
<http://dx.doi.org/10.1787/888933432665>

Figure 2. 10 Mathematics Literacy: Proficiency scales

As per Table 2.7, Australia's results showed a significant difference between the performance of the top 10% and lower 10% of students compared with Finland. This wide differential suggests lower equity in Mathematics Literacy than in other OECD countries.

Table 2. 7 Performance in Mathematics Literacy (PISA 2015)

Mathematics Literacy	Australia	Finland	OECD average
Average ¹	494	511	490
Point difference between 10 th and 90 th percentiles	242	210	232

Based on and includes information from the following source:

¹ Source: OECD, *PISA 2015 Results (Volume 1): Excellence and Equity in Education, Table 1.5.3*

Comparative performance in PISA - Australia

In Science Literacy, the average indigenous student scored 76 points lower than the average non-indigenous student, which is equivalent to two-and-a-half years of schooling. Further,

the average indigenous student scored 71 points lower in Reading Literacy and 70 points lower in Mathematics Literacy, equating to around two-and-a-third years of schooling for both literacies (see Table 2.8).

Metropolitan students had a distinct advantage over provincial (or rural) students, which was even more pronounced compared with their remote counterparts.

The difference in average performance based on migration status was not as marked. Although Australian-born students appeared to have some advantage over their foreign-born and first-generation counterparts for Science and Reading literacies, they were less successful in Mathematics Literacy.

Finally, difference in performance by gender was particularly significant in Reading Literacy, where females demonstrated an advantage of one year of schooling over their male peers.

Table 2.8 *Score difference in performance in Australia (PISA 2015)*

PISA 2015 Scores	Science Literacy ¹	Reading Literacy ¹	Mathematics Literacy ¹
Indigenous students: versus non-Indigenous students	-76 (~2.5 years of schooling)	-71 (~2.3 years of schooling)	-70 (~2.3 years of schooling)
Metropolitan: versus Provincial versus Remote	+26 (~1 year of schooling) +44 (~1.5 years of schooling)	+31 (~1 year of schooling) +46 (~1.5 years of schooling)	+29 (~1 year of schooling) +42 (~1.5 years of schooling)
Australian: versus Foreign-born versus First-generation	+15 (~0.5 years of schooling) +10 (~0.3 years of schooling)	+17 (~0.5 years of schooling) +16 (~0.5 years of schooling)	-6 (statistically similar) -14 (~0.5 years of schooling)
English spoken at home: versus LOTE*	+27 (~1 year of schooling)	+20 (~0.6 years of schooling)	+9 (statistically similar)
Females: versus males	-2 (statistically similar)	+32 (~1 year of schooling)	-6 (statistically similar)

Based on and includes information from the source below:

¹ Source: Thomson, S., De Bortoli, L., & Underwood, C. (Australian Council of Educational Research) (2017). *PISA 2015: Reporting Australia's results*

* LOTE – a Language other than English. This category refers to "language spoken at home most of the time".

2.3 Curriculum design principles and purpose

This section details contextual information related to recent curriculum design work undertaken in Australia and Finland. The contexts and challenges influencing curriculum decisions in Australia and Finland are not dissimilar, with both curricula stating the intention to create informed citizens with the knowledge and skills to navigate an increasingly complex

and rapidly changing world. This approach is consistent with education projects led by the OECD, of which both countries are members, which focus on 21st century skills such as collaboration, communication, creative and critical thinking.

Both curriculum documents identify common principles of equity and equality, derived from basic principles that all citizens have equal access to high-quality education and training. Curriculum design principles are reflected in a framework or curriculum structure dedicated to meeting the needs of a range of students, including student diversity. In the case of Finland, the curriculum indicates a shift toward recognising students' individual and various talents as well as an increased emphasis on student health and wellbeing (Sahlberg, 2017a).

Education Policy

Providing equal opportunities for all citizens to high-quality education and training is an enduring objective of Finnish education policy. Finnish education is driven by the “competitiveness and wellbeing” of Finnish society (FNBE, 2016). Key elements of Finnish education policy include quality, efficiency, equity, wellbeing and internationalisation (The Basic Education Act and General Education Policy, 1998). The requirement for equality has influenced directions for national curriculum development and, in particular, the need for a national curriculum framework that supports basic education.

A fundamental value is that every Finnish student is unique and has the right to a high quality education. The Basic Education Act (1998), for which Australia has no national equivalent, legislates free education at all levels from pre-primary to higher education. The primary objective of basic education is to “support pupils’ growth towards humanity and ethically responsible membership of society and to provide them with the knowledge and skills needed in life” (FNAE, n.d.).

Compulsory education in Finland comprises nine years of schooling from Grades 1-9 for all students aged between 7 and 16 (Figure 2.11). Basic education starts at the age of seven, which is one year later than seen in most OECD countries. All children aged six attend pre-primary education in Finland; this became compulsory in August 2015. Compulsory schooling for early childhood education is not typical practice in most OECD countries.

Students who have successfully completed compulsory education qualify for general and vocational upper secondary education. The Finnish National Curriculum for Education determines the objectives and learning outcomes of a range of subjects and study modules for general upper secondary education. Based on the modular arrangement of upper secondary education, students may combine studies both from upper general education and vocational training.

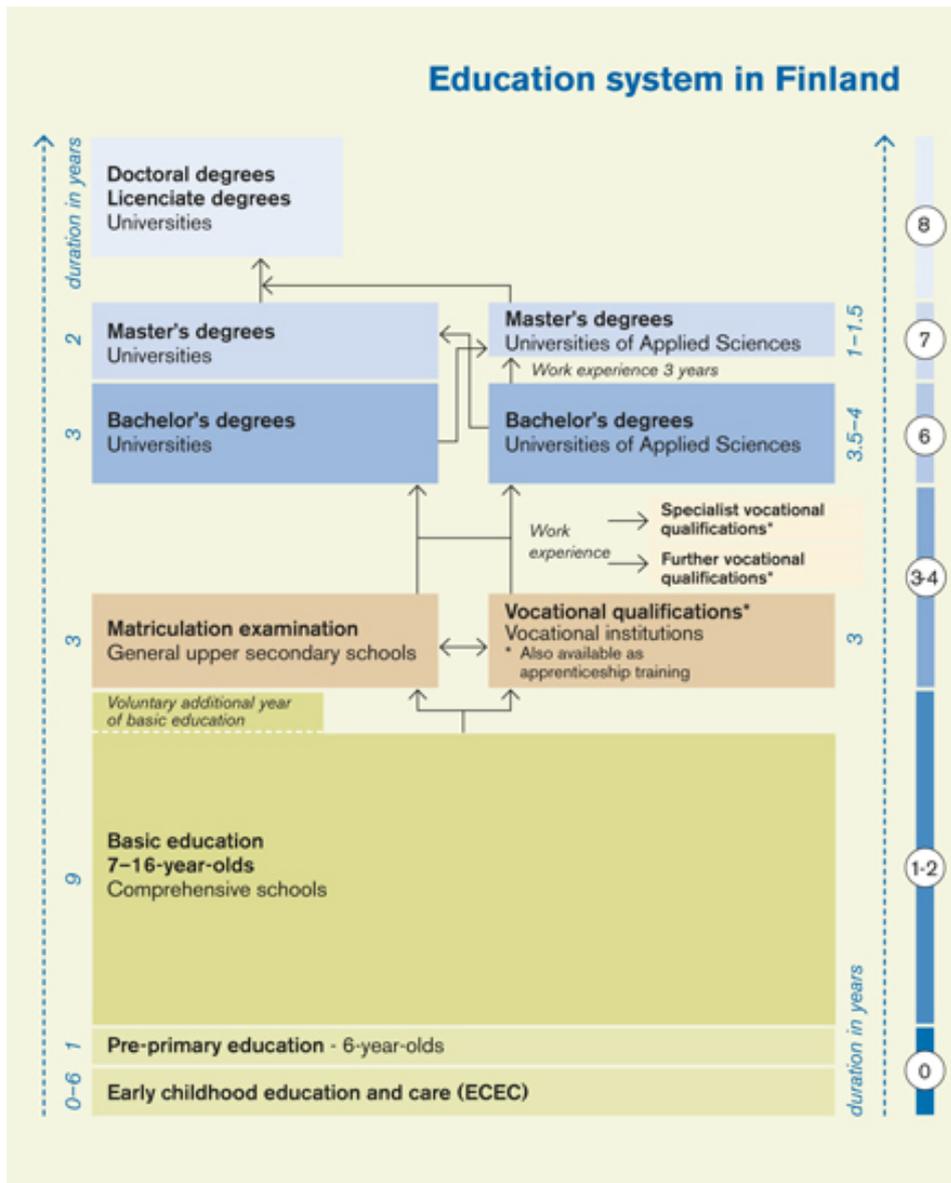


Figure 2. 11 Education System in Finland

From "Education system: Equal opportunities to high-quality education" by Finnish National Agency for Education, 2018 (http://www.oph.fi/english/education_system). Copyright by Finnish National Agency for Education. Reprinted with permission.

The AC has its origins in a single document, the *Melbourne Declaration on Educational Goals for Young Australians* (2008), which identifies two overarching goals:

- Goal 1: Australian schooling promotes equity and excellence
- Goal 2: All young Australians become:
 - successful learners
 - confident and creative individuals
 - active and informed citizens

The policy plan for Australia's schools is shaped by reforms delivered under AGDET *Students First* (2016). To confirm Australia's future prosperity and to remain competitive internationally, the Australian Government is committed to giving all students access to a

high-quality education. In partnership with states and territories and the non-government sector, the Government's commitment to improving outcomes in Australia's schools is reflected in four areas:

- teacher quality
- school autonomy
- engaging parents in education
- strengthening the curriculum.

A robust, relevant and current AC is essential to improving the quality of education for all school students. According to the Australian Government's *Students First* policy (2004) "In particular, high-quality school education in Science and Mathematics education is considered critically important for Australia's current and future productivity".

2.3.1 The Finnish National Core Curriculum: Structure and Design principles

The FNBE introduced the National Core Curriculum for pre-primary education and basic education (primary and lower secondary) in 2014. The renewal of the core curricula originated from a government decree in 2012 concerning the general aims of education and the allocation of lesson hours. In 2016, a new, reformed Finnish core curriculum for compulsory basic education was implemented in all municipalities and schools. Practical support for the implementation of the national curriculum at local levels included in-service and training courses accompanied by publication of new learning materials.

Finland's first national curriculum, published in 1972, was a strongly centralised document. By contrast, the national core curriculum is a "fairly new invention" (Vitikka et al., 2012). Increased teacher autonomy and decentralisation have enabled local jurisdictions to make decisions about curriculum and placed an increased emphasis on meeting individual student needs. Legislative reform in the 1990s shifted focus to educational goals and students' rights and responsibilities. Additionally, national testing was mooted. The testing was intended to be a sample-based instrument that would gauge national learning outcomes.

The reformed FNCC aims at providing a common direction and ensuring that the knowledge and skills of Finnish children and youth will remain robust in the future, both in national and international contexts (FNBE, 2016). It emphasises key principles of inclusive education (FNBE, 2007), multidimensional and deep learning, enhancement of transversal and subject competences, and the establishment of school learning communities consistent with "the spirit and formulations of the chapters on value basis and concept of learning" (Vitikka et al., 2012).

Determined by the FNAE, the FNCC provides a common structure and basic pedagogical guidelines for informing "local, context-driven curriculum". Essentially, it is a "framework for developing local curricula" (Vitikka et al., 2012). Within the flexible framework, local curricula must define values and underlying principles, as well as deciding on general educational and teaching objectives. Local jurisdictions are expected to address the educational needs of students requiring special support and those belonging to different language and cultural groups.

Debates surrounding educational aims and pedagogical imperatives have fuelled shifts in curriculum direction. The new curriculum encourages development of “school culture” and an “integrative approach” to learning (FNBE, 2016) that draws on transversal (cross-curricular) competences and multidisciplinary learning. An integrative approach recognises a shift in curriculum design from a subject-based approach towards one that emphasises competences (Ministry of Education and Culture, 2017), which are “at the heart of Finnish curriculum development” (Vitikka et al., 2012).

Finland’s core curriculum identifies seven transversal competences that exemplify the aims of education and mirror the competences required in all aspects of life. ‘Competence’ is defined as constructed knowledge, skills, values, and will (FNBE, 2016). The transversal competences are:

- Thinking and learning to learn
- Cultural competence, interaction and expression
- Taking care of oneself managing daily life
- Multiliteracy
- ICT competence
- Working life competence and entrepreneurship
- Participation, involvement and building a sustainable future.

As opposed to instruction characterised by traditional approaches to intelligence (demonstrated ability) and subject-based learning, the new core curriculum aims at engaging students in interdisciplinary instruction that has more relevance to real-life phenomena (Sahlberg, 2015). For example, schools are expected to design and implement multidisciplinary units or modules “at least once every school year” (FNBE, 2016). All schools quarantine time for the teaching and development of these multidisciplinary projects.

The FNCC remains committed to discipline-based organisation of content. Integral to curricular reform, the FNCC reflects a review of hours of instruction, highlighting a re-prioritising of disciplines. For example, arts education received an increase in time allocation across Grades 1-9, together with Civics and History, whereas the subjects of religion and ethics experienced a reduction.

The needs of 21st century learners, local agendas and results from national surveys were instrumental in the development of the FNCC. For example, the reformed curriculum seeks to address concerns about student engagement and curricular relevance through “active involvement of students, meaningfulness, joy of learning and school cultures” that enhance interaction between pupils and teachers (FNBE, 2016). Consequently, students are afforded greater agency and a stronger voice in their learning (Sahlberg, 2017b). This principle is mirrored in the OECD’s Education 2030 Project, where student agency is identified as one of three underlying key concepts of the draft Conceptual Learning Framework. Student agency is deemed essential to young learners’ development of the transformative competences (OECD, 2018) required to navigate the VUCA (volatile, uncertain, complex, ambiguous) world of the 21st century.

The design process of the curriculum deserves mention. As with the development of the AC,

the process involved analysis of the available research and consultation with experts. Finnish authorities also used the outcomes of several evaluations and development projects, as well as feedback on the everyday experiences of local municipalities and schools. Described as an “open and transparent” process, the development of the curriculum was led by the FNBE and involved collaboration with pertinent stakeholders including education providers, principals and teachers, researchers, teacher educators and the wider public, including parents, to provide feedback on drafts (FNBE, 2016).

Draft documents were published on the FNBE website and the role of classroom practitioners was acknowledged:

As a result of this process, the reform itself and the core curricula have been met with a positive response throughout the field of education and from the Finnish society. The key is trust. Teachers trust that the FNBE really listens to their experiences, needs and ideas, and the FNBE trusts that local authorities and teachers do their best in drawing up the local curricula and working according to the common guidelines. As there is a lot of autonomy for local authorities in providing education, municipalities may develop their own approaches to implementing the curricula, differing from those of other municipalities. (Halinen & Holappa, 2013, pp. 39-40, 57-58; Halinen, 2016).

Structure and purpose of the curriculum

Three essential ideas inform the current structure of Finland's curriculum, that is:

- goals are embedded in legislation and the national core curriculum
- autonomous municipal authorities are charged with providing and administering education including curriculum at the local level
- teachers are valued as experts responsible for developing school-based curriculum and generating innovative and differing approaches to teaching (FNBE, 2011).

The FNCC consists of two parts:

- objectives and core contents for teaching for all subjects, including the mission, values and structures of education
- conceptions of learning and goals for developing the learning environment, school culture and working methods (FNBE, 2011), as well as the principles of guidance support, differentiation and assessment.

Over the last decade, and as a consequence of Finland's education system becoming more centralised, the national curriculum has developed as a ‘normative’ document that emphasises national decision-making and minimises differences in local implementation (Vitikka et al., 2012, J. Kauppinen, personal communication, August 16, 2017). A distinguishing feature of the core curriculum is teachers' active involvement in ‘making’ local curricula; that is, ownership of the curriculum is reinforced by the autonomy and freedom afforded to teachers (Vitikka et al., 2012). Collaboration between national and local curricula reflects highly effective practice, following curriculum design principles that focus less on subject specialisation and compartmentalisation and more on structure and pedagogical functions.

The national core curriculum functions as an administrative, pedagogical and intellectual document.

As an administrative document, the curriculum has a “strong judicial remit” (Vitikka et al., 2012). Importantly, it is designed as a guide and not a strict set of rules (Sahlberg, 2015). The curriculum is written in the form of guidance for teachers about learning experiences rather than descriptions of what students are expected to learn; the latter is much more a characteristic of the AC. For example, the Finnish concept of teacher as a facilitator of student learning is evident in the wording of the learning objectives, using phrases such as “to guide/support/encourage pupils to ...” or “to offer pupil opportunities to...”.

The FNCC is distinguished by a “strong idea of individuality and pedagogical freedom” (Vitikka et al., 2012). Finland’s teacher education system attracts international interest; its teachers are trusted educational professionals who must complete five to six years of postgraduate study and are seen as key players in curriculum development. As is true in Australia, they are afforded pedagogical freedom to choose their materials and teaching methodologies.

As a pedagogical document (Vitikka, 2004), the FNCC is conceived as a tool for developing teachers’ pedagogical thinking and growing their own pedagogical praxis (Vitikka et al., 2012). It details assumptions and understandings about content-specific knowledge and skills, learning and learning environments, and teachers’ work practices (FNBE, 2016).

As an intellectual document, a curriculum defines what is culturally important. Technology and societal change have transformed understandings about information and knowledge, so that Finland has shifted its focus from what was perceived as an information-centred and fragmented curriculum to a learner-centred curriculum defined by content and aims that are responsive to the needs of individual students. Finland’s curriculum may be best described as ‘holistic.’ In this sense, a holistic curriculum addresses individual needs emerging from the interactions between teacher, student, and the world, originating in Dewey’s (1916) propositions about the organic relationship between child and curriculum.

Using a three-dimensional matrix (Foshay, 2000), the FNCC may be conceived as a framework that fuses aims, content and pedagogy into an interconnected whole. Optimally, it acts as a “meta-level structure” that enables a common base for curriculum thinking and the delivery of essential concepts of the curriculum (Vitikka et al., 2012).

2.3.2 The Australian Curriculum: Design principles

There is no intention to critique the history and development of the AC. Relevant aspects of the process and the characteristics of the AC are provided here for the purpose of the comparative study.

The AC has its origins in a single document, the *Melbourne Declaration on Educational Goals for Young Australians* (2008), which identifies two overarching goals:

- Goal 1: Australian schooling promotes equity and excellence
- Goal 2: All young Australians become:

- successful learners
- confident and creative individuals
- active and informed citizens.

The AC aspires to help all young Australians become successful learners, confident and creative individuals, and active and informed citizens. The three-dimensional design of the Foundation – Year 10 AC recognises disciplinary knowledge, skills and understanding alongside general capabilities and cross-curriculum priorities. Together, the AC and the FNCC share a common focus on 21st century skills embedded in the transversal competences and general capabilities. As well, Finland’s deep commitment to guiding students towards sustainable living and understanding the importance of sustainable development (FNBE, 2016) finds complementarity with the AC priority – Sustainability. As well, the transversal competency (T2) of Cultural Competence, interaction and expression is synonymous with the AC’s cross-curriculum priority, Aboriginal and Torres Strait Islander Histories and Cultures.

Like the FNCC, the AC functions as an administrative and intellectual document. To a lesser extent, the AC provides curriculum guidance for teachers, especially in relation to student diversity. Unlike Finland’s, Australia’s national curriculum does not serve as a pedagogical document.

Australia, like Finland, provides a relatively high degree of legislative freedom to education authorities to develop and implement the national curriculum. Australia is a federal system wherein both the development and implementation of a national curriculum depend on a high degree of cooperation from the states and territories, largely because these jurisdictions carry devolved responsibility for primary and secondary schooling. They work with ACARA to deliver the national curriculum in ways that best meet the needs of their students.

Eleven propositions have shaped ACARA’s development of the AC, with the overarching rationale centred on quality and equity:

- quality – an Australian Curriculum will contribute to the provision of a world-class education in Australia by setting out the knowledge, understanding and skills needed for life and work in the 21st century and by setting high standards of achievement across the country
- equity – an Australian Curriculum will provide a clear, shared understanding of what young people should be taught and the quality of learning expected of them, regardless of their circumstances, the type of school that they attend or the location of their school (ACARA, 2017c).

As part of the original curriculum development process, a document titled *The Shape of the Australian Curriculum* (v 4.0, 2012) underwrites the purpose of the AC:

- to improve the “quality, equity and transparency of Australia’s education system” (AGDET, 2014, p. 26). [Quality is defined as “knowledge, understanding and skills needed for life and work in the 21st century”. Equity is defined as “a clear, shared understanding of what young people should be taught and the quality of learning expected”]

- to address the “intellectual, personal, social and educational needs of young Australians’ within the context of a changing global environment so that they can function as ‘successful learners’, ‘confident and creative individuals’ and ‘active and informed citizens” (AGDET, 2014, p. 65).

The AC is presented as a progression of learning from Foundation to Year 10, with a range of subjects available for study in the senior secondary years (Years 11 and 12).

Among the eleven propositions that inform the design of the AC, item (i) explicitly states that:

The primary audience for the Australian Curriculum is teachers. The curriculum is concise and expressed in plain language while preserving a complexity appropriate for professional practitioners. Consistency in terms of language and broad structure supports teachers in planning within and across learning areas (ACARA, 2017d).

Numerous other propositions also point to the teacher as the primary consumer and interpreter of the AC. Teachers and schools are expected to make all practical decisions about the delivery of the AC, including the allocation of time and other resources as appropriate to their local context, and they are responsible for all pedagogical and other considerations that will meet the needs of their students.

Students are identified in the AC’s achievement standards, specifically in relation to the expectations set for them by the AC at the various stages of schooling. The AC recognises the entitlement of each student to knowledge, understanding and skills that provide a foundation for successful and lifelong learning and participation in the Australian community.

The AC is distinctive in its three-dimensional design, with disciplinary knowledge, skills and understanding, general capabilities and cross-curriculum priorities appearing to be accorded equal weight. The eight learning areas comprise an extensive collection of content descriptions, elaborations and achievement standards. The general capabilities and cross-curriculum priorities are designed to be taught through each of the learning areas, as teachers consider appropriate.

The three dimensions of the Australian Curriculum

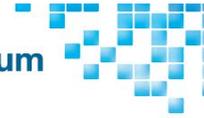


Figure 2. 12 The Australian Curriculum 'cube'

The three dimensions of the Australian Curriculum, ACARA (2017d), from <https://www.australiancurriculum.edu.au/f-10-curriculum/structure/>

3 COMPARATIVE STUDY

3.1 Purpose

As part of the commitment to monitoring international developments in curriculum design, a key component of ACARA's program of research involves comparison of the AC with high-performing school systems and countries.

3.2 Method

This comparative study is based on the *Australian Curriculum Version 8.3* (ACARA, 2016), and the *Finnish National Core Curriculum for Basic Education 2014* (English translation), Publication 2016:5 (FNBE, 2016).

ACARA's Curriculum Specialists conducted a detailed comparison of their learning areas during the first half of 2017. The AC provides for eight learning areas from Foundation to Year 10. The chosen comparison points for this study were Years 2, 6 and 10. In comparing learning areas, it was not possible to make a completely straightforward comparison with Year 10, as Finland's core curriculum is structured a little differently (the Finnish education system is organized from Grades 1-9).

As well, the alignment between Finland's Grade 2 and Australia's Year 2 was not exact. Consequently, learning areas at the year 2-exit point were not determined according to breadth, depth and rigour, as per the methodology utilized for these comparative studies. Instead, a descriptive summary of each country's curriculum was provided at the year 2-exit point.

In addition to comparisons with the learning areas of the two curricula, three other aspects of the AC were compared with relevant features of the Finnish curriculum. For the AC, these included the General Capabilities, Aboriginal and Torres Strait Islander Histories and Cultures and Student Diversity.

The ten analyses of these curricular components are included in their original templates in the body of this report.

3.3 Data collection and analysis

ACARA's Curriculum Specialists conducted a comparative analysis of the FNCC and the AC across Years 2, 6 and 10, using measurements of breadth, depth and rigour to make a determination on a three-point scale.

For the purpose of this analysis, the following understandings of breadth, depth and rigour were applied:

- **Breadth** refers to the range or amount of content or topics (predominantly factual and procedural knowledge) covered in the curriculum. This is often referred to as *coverage*.
- **Depth** refers to the detail or amount of knowledge that leads to the development of deep understandings of key concepts, principles and knowledge and the ability to apply these understandings to real-life contexts.

- **Rigour** is defined as the cognitive demand required for students to engage in higher-order learning.

The data were collected by each Curriculum Specialist and recorded with the assistance of a template, then collated and graphically represented in the form of a heat map where the individual values are represented as colours. Some variation in presentation is seen in the templates as differences in the provision and sequence of learning areas are addressed.

The findings were categorised and analysed by learning area and year (AC)/Grade (FNCC).

3.4 Findings

While the structures of the AC (F–10) and the FNCC (Grades 1-9) are different, the breadth, depth and rigour are generally comparable. The following section details findings by subject and year/grade with respect to breadth, depth and rigour.

Breadth

On balance, the analysis by ACARA’s Curriculum Specialists shows that both the AC and the FNCC offer considerable breadth. Across the AC, all subjects at Years 2, 6, and 10 are broad in coverage, based on evidence that each learning area consists of quite dense and lengthy content descriptions supported by detailed elaborations, as well as subject-specific topics deemed age-appropriate.

For example, the expectations of the AC: Humanities and Social Sciences (HASS) are achieved through the combined agency of four subject areas, which are all regarded as **comprehensive** in breadth.

The concepts and skills of Australian Curriculum: History (AC: H), Australian Curriculum: Geography (AC: G), Australian Curriculum: Civics and Citizenship (AC: CC), and Australian Curriculum: Economics and Business (AC: EB) in Year 10 allow learners to build upon experiences from each of these specific subject areas in Years 7, 8 and 9. Each subject has its own collection of overarching concepts, inquiry questions, inquiry skills, knowledge and understanding, with associated elaborations to support teaching and learning.

This is to be compared with the Finnish equivalent, which adopts a multidisciplinary approach to construction and delivery of content and embeds the seven transversal competences.

For students in Grade 9, the expectations of the Finnish National Core Curriculum: Geography (FNCC: G), the Finnish National Core Curriculum: History (FNCC: H), and the Finnish National Core Curriculum: Social Studies (FNCC: SS) are **comprehensive** in relation to breadth of coverage.

During the three years of the FNCC: G, the content explores the interconnection between the map of the world and current world events. The aim of the FNCC: G is to “support the construction of the pupils’ worldview” (FNBE, 2016, p. 462). With the adoption of a multidisciplinary approach to examine the Earth, its natural regions, human activities and different cultures, students are expected to study the local region and specific examples from Finland, as well as undertaking field work and learning about electronic geographical information systems. Each of the seven transversal competences is referenced at least once,

with most emphasis upon T4 (Multiliteracy) followed by T5 (ICT competence) and T7 (Participation and involvement in building a sustainable future).

The FNCC: SS is distinguished by its capacity to redefine the scope or breadth of *knowledge* and *skills* to uncover deeper understanding and broader application.

Alternatively, and in similar ways to the AC, the FNCC: Science (comprising the subjects of Biology, Chemistry, Physics, and Geography) is deemed **comprehensive** in relation to the number of objectives and content areas.

Each of the subjects specifies between 13 and 15 Objectives of Instruction and six Content Areas that expose students to a large variety of scientific concepts, including many that deal with the nature of Science, its technological applications and mutual impact on society. Students are expected to engage in collaborative activities as well as those that encompass all stages of the research process.

The Crafts and aspects of Environmental Studies (Technologies equivalent) at Grades 3-6 are deemed *fundamental*, based on differing expectations.

The main difference between the two lies in the expectations for knowledge and understanding, particularly in relation to Digital Technologies. In the FNCC, ICT is presented through the Competency framework ICT (C5) as an integrated approach across all Learning Areas, much like the AC: ICT Capability.

In this learning area, the breadth of learning in the AC is generally rated as more challenging than in the FNCC, since students address discipline-specific content (knowledge and understanding) both in Design and Technologies and Digital Technologies as well as applying this content when creating solutions (developing skills). The breadth of learning in the FNCC primarily deals in materials, using aspects of technologies contexts such as engineering, food and fibre production or food specialisations addressed either in Environmental Studies or through the school meals policy. There is no Digital Technologies content.

Depth

The comparative study reveals variability surrounding **depth**. At a glance, per Table 3.1, considerable depth is accorded to most subjects across the AC, particularly in the secondary years.

Across the AC, there is a high degree of consistency among subjects described as *challenging*, including English at Years 2, 6 and 10, and Mathematics at Years, 2, 6 and 10 (see Table 3.1). For the FNCC, the natural and social sciences, Mother Tongue and Literature, and foreign languages are deemed *challenging* at Grades 6 and 9.

Table 3. 1 *Subjects by Depth: Challenging*

Year/Grade	Australian Curriculum	Finnish National Core Curriculum
6	English Maths The Arts Technologies Health and Physical Education Languages (Italian)	Environmental Studies (Science) History Social Studies Foreign Languages
10/9	English Maths Science The Arts Technologies Health and Physical Education Languages (Italian)	Mother Tongue and Literature History Social Studies Foreign Languages Crafts

Variation is observed in the AC: Science, with a determination of *limited* depth at Year 6. Evidence for this rating is cited from the analysis:

The expectations of the AC: Science (Year 6) are **limited** with respect to the depth of coverage of knowledge and skills encountered in the curriculum. The problem relating to the uncertainty about which scientific concepts are the intended focus of teaching and learning and the depth to which they are expected to be explored has already been addressed in Year 2. Even stronger arguments to that effect can be made for Year 6.

This is to be compared with the FNCC for students in Grade 6 Science for whom the overall expectations are addressed in the subject Environmental Studies (FNBE, 2016) and the depth is considered *challenging*. As detailed, the FNCC: Environmental Studies expresses high expectations with respect to depth of understanding applied to scientific concepts.

For example, the Content Area ‘Structures, principles, and cycles of nature’ (C5) states that “Combustion, photosynthesis and the hydrological cycle form the basis for perceiving the changes in substances and the law of conservation of mass”. The chemical and physical processes addressed here can be considered challenging for Grade 6 level. For students to gain a deep enough understanding of these processes and be able to link them to the law of conservation of mass in a meaningful way would require an in-depth investigation of this topic. The FNCC: ES expresses similarly high expectations with respect to depth for science inquiry skills, as, for example, evidenced in the objective “to guide the pupil in obtaining reliable information, expressing and justifying different views, and interpreting and critically evaluating information sources and viewpoints” (O14) (FNBE, 2016).

Table 3.2 shows subjects deemed *fundamental* across Years 6 and 10 for the AC. For the FNCC, the rationale for this determination varies across subjects. For example, the FNCC: Mathematics at Grade 6 states that “instruction is founded on topics and problems that are familiar and of interest to the pupils” and that “pupils continue to learn mathematics in an environment where a concrete approach and tools are essential” (FNBE, 2016). Arguably, the depth of the content with which students will engage is less clear in the documentation

than it is in the AC. Whereas the design of the FNCC: Mathematics allows for rich and deep learning, the curriculum may be seen as more dependent on teacher expertise to develop learning programs commensurate with the skills and understandings described in the key content areas.

The syllabus for Mother Tongue and Literature is deemed *fundamental*. The broad and generalist nature of many of the learning objectives make it difficult to judge the depth of learning. Nevertheless, the FNCC at Grade 6 is sufficiently broad, and depth in the FNCC may be calculated with respect to the pedagogical expertise and flexibility accorded to local jurisdictions. Although viewed primarily as an administrative document, the FNCC is conceived as a tool for teachers to develop their pedagogical practice and facilitate learning, as expressed in the Objectives through words such as *guide*.

Table 3. 2 *Subjects by Depth: Fundamental*

Year/Grade	Australian Curriculum	Finnish National Core Curriculum
6	Humanities and Social Sciences	Mother Tongue and Literature Mathematics Physical Education Crafts (Technologies)
10/9	Science Humanities and Social Sciences	Mathematics Environmental Studies (Science) Physical Education, Health Education

Rigour

As this comparative analysis confirms, debates about curricular provisions frequently relate to rigour. There is a tendency to perceive a flexible structure or curriculum – particularly one that is less prescriptive – as having no intellectual ‘grunt’ or inevitably being less rigorous. This study contends that a flexible curriculum derives its strength from distinctive pedagogy and teacher expertise. As a rule of thumb, it may, however, be difficult to ascribe a high degree of rigour if there is less discipline-specific content to consider.

Nevertheless, this study reports high levels of rigour across both curricula. As Table 3.3 shows, the AC: English and FNCC: Mother Tongue and Literature curricula at Years/Grades 6 and 10/9 are determined as having a consistently high degree of rigour, together with a high level of rigour ascribed to Languages and Foreign Languages, HASS and History and Social Sciences. By Grade 9, more subjects in the FNCC register high cognitive demand, continuing the focus on the natural and social sciences, Mother Tongue and Literature such that no lesser determinations were accorded to the FNCC Grade 9.

As per Table 3.4, lesser determinations are ascribed to Science, HASS and PE across Years 6 and 10. This finding is consistent with determinations of depth. Of interest in relation to the AC are those subjects that are deemed *fundamental* in the primary and middle years of schooling and, in particular, those subjects that aspire to give students the skills and

technologies necessary to be successful at school as well as to prepare for life and work beyond school. A similar set of subjects presents for the FNCC at Grade 6.

Table 3. 3 *Subjects by Rigour: Challenging*

Year/Grade	Australian Curriculum	Finnish National Core Curriculum
6	English Mathematics The Arts Technologies Languages	Mother Tongue and Literature History Social Studies Foreign Languages
10/9	English Mathematics Humanities and Social Sciences The Arts Technologies Health and Physical Education Languages	Mother Tongue and Literature Environmental Studies: Science History Social Studies Physical Education, Health Education Foreign Languages Crafts

Table 3. 4 *Subjects by Rigour: Moderate*

Year/Grade	Australian Curriculum	Finnish National Core Curriculum
6	Science Humanities and Social Sciences Health and Physical Education	Mathematics Environmental Studies: Science Physical Education Crafts
10/9	Science	Nil

General Capabilities and Cross-Curriculum Priorities

In addition to comparison of the discrete learning areas, a comparative analysis was also undertaken of the AC General Capabilities and the FNCC Transversal Competences. The AC promotes seven General Capabilities; the FNCC acknowledges seven Transversal Competences across learning areas.

The AC General Capabilities and the FNCC Transversal Competences both detail the skills, attitudes and values that each nation has identified as being crucial for the development of a well-rounded and capable future citizen. In both countries, there is the expectation that the capabilities, or competences, will develop as students engage with the content of the learning areas/subjects. For both countries, the breadth, depth and rigour are deemed comparable, although implementation across each curriculum differs markedly.

While there is not an exact match between the two curricula, as shown in Table 3.5, it is possible to determine how, and to what degree, the AC and FNCC intend students to master the skills that they will require for participation in their post-school world.

Table 3. 5 *General Capabilities Matched to Transversal Competences*

General Capabilities	Transversal Competences
Personal and Social Capability	Taking care of oneself, managing daily life
Critical and Creative Thinking Capability	Thinking and learning to learn
Literacy	Multiliteracy
Numeracy	No equivalent
ICT Capability	ICT Competence
Intercultural Understanding	Cultural competence, interaction and expression
Ethical Understanding	No equivalent
	Working life competence and entrepreneurship
	Participation, involvement and building a sustainable future

Additionally, the AC Cross-Curriculum Priority compared with Finland's approach to the inclusion of indigenous learning and cultural understanding suggests the latter has greater breadth, depth and rigour.

3.5 Discussion

The balance between breadth and depth is central to curriculum design, with recent research suggesting that, in a 21st century curriculum, depth should be prioritised over breadth (Masters, 2015). For some time, there has been concern that providing students with some knowledge about a range of topics can lead to a *mile-wide, inch-deep* curriculum.

The FNCC reflects a 21st century curriculum that aspires to a broad range of knowledge and skills underpinned by:

- knowledge that is discipline-based and inter-disciplinary-based, and designed to promote deeper understanding and broader application
- attitudes and values at personal, local, societal and global levels, including human values that should be respected (e.g. respect for life, respect for environment) regardless of place.

The FNCC subscribes to a 'normative' curriculum which is not prescriptive, and from which emerge values or norms that reflect new understandings, vision and ethical behavior (Short, 1991).

Ongoing debate about curriculum design indicates that the claim of 'less is more' may not yet be universally accepted as a worthy principle of curriculum design. This study, for example, uncovers a content-heavy and prescriptive AC distinguished by disciplinary knowledge, skills, and understandings. Across and within the subject areas, the content descriptions and elaborations are quite detailed, supported by the General Capabilities and cross-curriculum priorities that are developed throughout each subject area. Compared to the AC, the FNCC is structured around a set of core learning objectives linked to key content areas and underpinned by the transversal competences.

This comparative study reveals the growing significance of 21st century learning skills, which are generally embedded in the elaborations and/or reinforced in the AC General Capabilities. These skills are well documented in the FNCC. Whereas the AC achievement standards detail what students are expected to do as a consequence of subject-specific teaching, the FNCC embraces an integrative approach that enables interdisciplinary methodologies and inquiry-based learning. As a pedagogical document, the FNCC encourages individual and shared learning in promoting deeper engagement with learning, driven by the transversal competencies.

Methodologically, this comparative study is based on a document-to-document analysis. Although the AC attempts to strike a balance of depth and breadth, and a focus on rigour, it is more pronounced as students approach Year 10, as Figure 3.1 denotes. In its documentation, the AC claims to strive for a "rigorous, in-depth study, preferring depth to breadth wherever a choice needs to be made, with consideration also being given to the overall teaching and learning time available" (ACARA, 2012a, p. 10). In its language and format, the AC provides detailed descriptions of what students should learn and the quality of learning expected of them as they move through their schooling. Teachers use professional knowledge that is reflective of local and state contexts, taking into consideration the diverse nature of the student population (ACARA, 2012a).

This study proffers the notion that breadth and depth are equally important for a quality curriculum. Notwithstanding, the study reinforces the obvious conclusion that both, or any, curricula depend on teacher expertise to engage students in rigorous learning activities that build knowledge and skills in equipping them for their future.

While this comparative study suggests that, in general, the AC has greater depth, both the AC and the FNCC exhibit high-level rigorous learning, especially in the secondary school.

	2			6			10		
	B	D	R	B	D	R	B	D	R
English	Green	Green	Green	Green	Green	Green	Green	Green	Green
Mathematics	Green	Green	Green	Green	Green	Green	Green	Green	Green
Science	Green	Yellow	Blue	Green	Orange	Blue	Green	Green	Blue
History and Social Studies	Green	Yellow	Blue	Green	Yellow	Blue	Green	Yellow	Green
Health and PE	Green	Yellow	Blue	Green	Green	Blue	Green	Green	Green
Languages	No assessment			Green	Green	Green	Green	Green	Green
Technology	Green	Yellow	Blue	Green	Green	Green	Green	Green	Green
The Arts	Green	Green	Green	Green	Green	Green	Green	Green	Green
General Capabilities	Green	Yellow	Blue	Green	Yellow	Blue	Green	Green	Green
Aboriginal and Torres Strait Islander Histories and Cultures							Orange	Orange	Blue

Figure 3. 1 Australian Curriculum by subject and student grouping

	2			6			9		
	B	D	R	B	D	R	B	D	R
Mother Tongue and Literature	no assessment			Green	Yellow	Green	Green	Green	Green
Mathematics	Green	Yellow	Blue	Green	Green	Green	Green	Green	Green
Environmental Studies (Science equivalent)	Green	Yellow	Blue	Green	Green	Blue	Green	Yellow	Green
Environmental Studies/History/Social Studies/Geography	no assessment			Green	Green	Green	Green	Green	Green
Physical Education/Environmental Studies	Yellow	Yellow	Green	Yellow	Yellow	Blue	Yellow	Yellow	Green
Foreign Languages	no assessment			Green	Green	Green	Green	Green	Green
Crafts/Environmental Studies (Technologies equivalent)	Green	Green	Blue	Yellow	Yellow	Blue	Green	Green	Green
Music /Visual Arts	no assessment								
Transversal Competences	no assessment			Green	Yellow	Green	Green	Yellow	Green
Sami History, Culture and Language							Yellow	Green	Green

Figure 3. 2 Finnish National Core Curriculum by subject and year group

Breadth		Depth		Rigour	
Green	Comprehensive	Green	Challenging	Green	Challenging
Yellow	Fundamental	Yellow	Fundamental	Blue	Moderate
Orange	Limited	Orange	Limited	Orange	Limited

Legend: Criteria Applied

3.6 Curriculum comparison templates by learning area / subject / dimension

a) English

Comparative Curricula

Australian Curriculum: English

Version 8.3, 2016

Finnish National Core Curriculum: Mother Tongue and Literature

Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2

Finnish National Core Curriculum: Grades 1-2

Learning Area/Subject

Australian Curriculum: English (AC: E)

Finnish National Core Curriculum: Mother Tongue and Literature (FNCC: MTL)

Expectations: Knowledge and Skills

The FNCC: MTL, which may be Finnish, Swedish, Roma or Sámi as determined by local authorities, is designated as the language of instruction in Finnish schools. Although not all students study in the same language, all follow a syllabus comprising common aims and elements. As well, students study at least one second language which follows a very similar syllabus, ensuring that students become truly bilingual.

The Mother Tongue and Literature (MTL) syllabus is designed to develop literacy, language proficiency and interaction skills, and to foster students' interest in language and literature, with a particular focus on cultural connections. The FNCC expects students to develop strong communication skills to support cross-curricular learning as well as social and civil interaction. Students are encouraged to develop and use their capacity for creativity. The syllabus takes a broad approach both in its objectives and content and does not detail particular aspects of language. For example, there is no prescribed developmental sequence for the introduction of spelling knowledge and strategies and the focus on phonic knowledge and skills is not as explicit as that expected of students in the AC: E. The AC: E is more detailed, particularly with regard to the knowledge and use of spelling, grammar, text structure and punctuation, with fourteen statements detailing what students are expected to know and a further eleven statements describing how students will use these skills to understand and create texts.

Both the AC: E and the FNCC: MTL are founded upon a socio-cultural approach to learning language; students are expected to make personal connections to texts and to use texts to connect with the wider world. The development of basic skills in a student's mother tongue and transversal competences form a continuum from pre-primary education to school. The FNCC adopts a holistic approach to the development of language knowledge and skills through objectives and content statements that describe broad aspects of students' behaviour. The FNCC: MTL is structured around general statements about language acquisition, many of which would have applicability at all levels of schooling, such as "pupils are supported in expanding their vocabulary, learning new concepts, verbalising their thoughts, and improving their interaction skills" (FNBE, 2016). By contrast, the AC: E is

organised into three interrelated strands, Language, Literature and Literacy, which describe the specific skills, knowledge and understanding that students will develop. The strand and sub-strand organisers support the recursive nature of English learning while the content descriptions describe the acquisition of knowledge, skills and understandings expected at Year 2. The content descriptions are supported by elaborations which provide suggested learning experiences for the content descriptions.

At Grades 1-2, the FNCC promotes “pupils’ self-expression and interaction skills and language awareness and to support the progress of their basic listening, speaking, reading, and writing skills based on their individual abilities”. Students’ interest in and enthusiasm for “linguistic expression, drama, literature, and the comprehension and production of multimodal texts” is strongly encouraged (FNBE, 2016, p. 143). Similarly, the AC emphasises the role of English in building knowledge and skills in the speaking, listening, reading and writing modes that can be applied across all learning areas and support a growing appreciation of literature.

The FNCC provides access to “ample resources of literature and diverse texts that [students] find interesting” (FNBE, 2016). The AC expects students to “engage with a variety of texts for enjoyment” (ACARA, 2017e) and the concept of *enjoyment* is realised through more specific responses both to literary and non-fiction texts.

Prominence is accorded to skills in interpreting and producing multimodal texts in the FNCC; designation of multimodal texts as a particular text type is more explicit in the Finnish curriculum. The AC refers to features of multimodal texts but takes the approach that multimodal texts are just one of an array of texts of different forms and types available to students.

Exploration of the aesthetic domain of language use prevails in both curricula. For example, Finnish students explore language *playfully*, using role-play, drama and theatre. Encouraging linguistic proficiency through the integration of drama and theatre distinguishes the FNCC, whereas the AC incorporates such learning into the Arts curriculum. At an early age, Finnish students are guided to become aware of “the multi-layered linguistic and cultural identities they and others have” (FNBE, 2016). They are encouraged to use language in different situations (*language in context*) to enhance their language awareness and parallel use of different languages as well as the development of multiliteracy (T4).

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: English (AC: E)

Finnish National Core Curriculum: Mother Tongue and Literature (FNCC: MTL)

Expectations: Knowledge and Skills

By Year 6, Australian students are able to draw upon an array of communication skills that they can adapt to a wide range of audiences and purposes. They are expected to analyse and explain how language, images and vocabulary can represent ideas, characters and

events and they create detailed texts elaborating on key ideas for a range of purposes and audiences, using evidence to justify a position. The AC places a strong emphasis on grammar, spelling and language structures and features, for application across all learning areas. By Year 6, students should have moved to a greater emphasis on the application of knowledge through reading, creating texts, speaking and listening. They engage with texts that broaden their understanding of the world and critically evaluate aspects of the world that impact upon them and are beginning to consider media.

Consistent with Grades 1 and 2, the Mother Tongue and Literature (MTL) syllabus concentrates on developing literacy, language proficiency and interaction skills, and fostering students' interest in language and literature, with a particular focus on the interconnectedness of these with culture. The first language, or language of instruction in the learner's school, espouses an approach that language proficiency is critical to success in school learning and in cultural and social contexts beyond school. It is understood that "knowledge about language, literature, the media and other forms of culture is acquired while the pupils develop their language proficiency and examine the meanings of texts" (FNBE, 2016).

Finnish students in Grade 6 study a language curriculum that is organised under four main areas: interacting, interpreting texts, producing texts and understanding language, literature and culture. The curriculum sets out learning expectations comprising fifteen objectives that describe what is to be taught. The objectives are supported by four content statements, which provide more concrete descriptions of what students will be able to do, know and understand at the end of their primary school education. The content statements specify the skills to be learnt and the types of texts to be used. Although both the objectives and content statements are closely aligned to the traditional language curriculum organisers of speaking and listening, reading and writing, the content statements support teachers to make connections between the modes. For example, within the 'producing text' content statement, students "examine and practise using linguistic and textual features that are typical of narration and description as well as of instructive and argumentative expression" (FNBE, 2016).

Both curricula are founded on strong principles of learning about language and then applying knowledge and skills to understand and create texts through reading, writing, speaking and listening. At Grades 3–6, there is increasing emphasis on developing "more fluent self-expression and interaction skills, reading and text production skills and strategies as well as to expand the selection of text genres" (FNBE, 2016, p. 211). Students are encouraged to engage "appropriately, safely and responsibly in increasingly versatile interactive situations, some of which are multimodal and digital". Using an orientation of 'learning to learn', students gain competency in "interpreting, producing and assessing more diverse texts". The AC is more explicit in describing which language features, forms and structures that students will learn. While both have a strong focus on "interpreting, producing and assessing more diverse texts" at this exit point, the AC places greater emphasis on understanding and creating persuasive texts (ACARA, 2017e).

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

The level of breadth in the AC: E at Year 6 level is regarded as **comprehensive**. By the end of Year 6, students understand and create a range of print and digital texts for clearly defined purposes and investigate and evaluate both literary and informative texts which enable them to expand their knowledge and form opinions on a range of real world and imaginary topics. At Year 6, twelve content descriptions comprise the Language strand, representing a reduced number on earlier years and reflecting the expectation that students have control over a broad range of decoding, spelling and grammatical skills. In Year 6, students continue to develop their understanding of text structure, more complex sentence structures, vocabulary and language features. The Literature strand contains seven content descriptions which detail how students continue to build skills in responding to, analysing and creating literary texts. These content descriptions follow a developmental path throughout the primary years as students expand and deepen their understanding of the structure, features, devices and purposes of literary texts and use this expanded knowledge to create their own texts. Eleven content descriptions from the Literacy strand describe how students apply the increasingly sophisticated knowledge from the Language strand to listen to, read, comprehend and create texts using both conventional and digital tools. Year 6 students are expected to understand and correctly use secretarial skills such as spelling a range of complex words, using most punctuation and controlling syntax and most grammar.

FNCC – Breadth

Breadth: Comprehensive

On the surface, and in contrast to the prescriptive nature of the AC: E, the FNCC: MTL includes broad holistic statements about what Grade 6 students are expected to know about the forms and features of language (ACARA, 2017e and FNBE, 2016). It recommends the types of texts students will produce and identifies the purposes for writing. The main content statement addresses writing, saying that “the pupils produce diverse fictional and non-fictional texts based on their personal experiences, observations, thoughts and opinions and other pupils’ texts. They consider the purpose of writing and how it is reflected in linguistic choices” (C3 Producing texts. Section 14.4.1). The curriculum describes the types of conceptual understanding that students are expected to study. For example, “pupils explore the way language varies according to the situation and topic and consider the meanings of words, expressions, and texts”. At Grades 3-6, students develop an understanding of the “meaning and status of the Finnish language, literature and other forms of culture in a multicultural and multilingual society”. Critical aspects of language acquisition such as

grammar, spelling or punctuation that students are expected to know are not detailed to the extent that they are in the AC. Nevertheless, the content areas contained in the FNCC for Grades 3-6 are commensurate with the AC's three strands and equate to a **comprehensive** coverage of curriculum.

AC – Depth

Depth: Challenging

The AC: E supports students to communicate for a range of purposes in a range of modes and forms. It also emphasises the deep thinking that should occur when students engage with or create texts; therefore, it is regarded as **challenging**. The curriculum explicates knowledge about language that provides critical underpinning to metacognition, thereby enabling students to make informed choices as they speak, listen, read and write. It develops students' knowledge and understanding of grammar, text structure and language features to support them in making appropriate choices when applying this knowledge to their own writing or when comprehending increasingly complex texts. Students are required to understand and use the forms and features of language with precision and relevance and to transfer knowledge to new and less familiar contexts, reflecting learning on a deeper level.

Students are expected to investigate a broad range of texts, from everyday texts to informative texts on remote topics and a range of quality literature. They engage deeply with texts by identifying themes and issues within texts, recognising points of view and justifying interpretations by referring to their own knowledge, values and experiences. The Year 6 AC: E supports deep learning in its requirement that students use multiple strategies to understand, evaluate and create texts and to process layers of meaning to conceptualise ideas from texts.

FNCC – Depth

Depth: Fundamental

The broad and generalist nature of many of the learning objectives, such as 'encourage and guide the pupil in verbalising his or her thoughts and practising the production of narrative, descriptive, instructive, and simple argumentative texts, also in multimedia environments', make it difficult to judge the depth of learning. Nevertheless, the FNCC: MTL at Grade 6 is sufficiently broad, and depth in the FNCC may be calculated on the pedagogical expertise and flexibility accorded to local jurisdictions. Although viewed primarily as an administrative document, the FNCC is also a tool for teachers to develop their pedagogical practice and facilitate learning, as expressed in the Objectives through words such as *guide*. From the evidence provided, depth in the FNCC at Grade 6 may be considered **fundamental**.

The FNCC lacks specificity in some areas. Statements such as "the pupil identifies some linguistic and textual features of narrative, descriptive, instructive, and simple argumentative texts" (FNBE, 2016) indicate less engagement with text purposes and features than is seen in the AC. Where particular aspects of language learning are noted, the curriculum describes a level of skill that could be considered very simple for students completing primary school. An example is "the pupil is able to give his or her text a heading, divide it into paragraphs, and pay attention to word choices" (FNBE, 2016). As well, information about the ideas or language features that students are expected to include in their texts and the inclusion of

qualifiers such as *simple* means that there is less evidence of rigorous engagement with texts.

AC – Rigour

Rigour: Challenging

At Year 6, the AC: E continues the development of knowledge, understanding and application of language from previous Years to promote in-depth learning of the key features of English in a coherent manner. The curriculum is **challenging** from a cognitive or intellectual perspective in that students continue to develop deeper and more expansive understanding of the key concepts of English such as context, grammar and purpose. The level of rigour is evident in the expectation that students will engage in diligent and scrupulous study of text and produce texts that are held to high standards of accuracy in features such as spelling and grammar, demonstrating deep understanding of key ideas and topics. At Year 6, students are expected to produce texts that reflect understanding of increasingly complex concepts.

The AC: E includes rigorous standards of proficiency in fundamental skills and asks students to use critical, creative and empathetic thinking to understand and produce texts. The focus in Year 6 is on comprehending, processing and analysing both the content of a wide range of texts and the authorial strategies and techniques used in different types of texts. Through their study of literature, students compare and contrast forms and styles of literature such as different poetry forms as well as the techniques used by authors and poets. They deconstruct texts to understand and explain the use of more sophisticated language features such as metaphor, going beyond recognising, describing and explaining. They are required to critique and evaluate the use of techniques and the way these techniques contribute to the development of theme. Rigour in the curriculum is derived from the way these learning processes challenge students' thinking in interesting and provocative ways.

FNCC – Rigour

Rigour: Challenging

For Grade 6 students, the FNCC continues the development of concepts, skills and processes developed in the early years. At this stage, the focus of Finnish language and literature is to promote Finnish students' "language proficiency, multiliteracy and interaction skills as well as to familiarise themselves with literature and culture". The FNCC: MTL draws strong links to cultural understanding and shaping personal identity through language. In particular, students are encouraged to understand the "meaning and status of the Finnish language, literature and other forms of culture in a multicultural and multilingual society" (FNBE, 2016). This requires deep understanding and purposeful thinking as a key element of language acquisition, including drawing on linguistic, media, and cultural knowledge acquired beyond school to support learning of the Finnish language. It must be noted that all students are simultaneously learning other languages in addition to Finnish.

Grade 6 students are exposed to **challenging** and rigorous learning. Rigour is achieved through an emphasis on "establishing the pupils' learning-to-learn and interaction skills", their "interest in reading" and "fluent and versatile reading and writing skills" (FNBE, 2016).

In the process of interpreting and producing texts, students examine the features of language and elements of literature. Students move from short texts to reading entire books and to sharing reading experiences in differing and creative ways.

Comparative Analysis

The design and organisation of the two curricula are very different. The FNCC: MTL is structured around general statements about language acquisition, many of which would be applicable at all levels of schooling. Pupils are supported in expanding their vocabulary, learning new concepts, verbalising their thoughts and improving their interaction skills (FNBE, 2016). The FNCC includes extensive support and guidance for teachers about the principles of language learning and recommended teaching strategies. Finnish teachers are expected to have strong knowledge about how the objectives and content can ensure teaching and learning that covers all the key aspects of language learning and includes specific skill-based instruction, as well as instilling in students a healthy regard for the enjoyment and understanding of texts.

Whereas the FNCC provides limited detail about the specifics of language and literature with which students will engage, the AC: E is more detailed and specific in its descriptions of the conventions and rules of language that students are expected to know and understand by Year 6. The Language strand of the AC: E includes twelve clear statements about the language features and forms students will know and be able to apply in order to acquire, construct and communicate meaning. The organisation of these features under common headings in each year of the F–6 curriculum supports an understanding of the developmental continuum of language development and the expected skill level at Year 6.

Finland's seven Transversal Competences, similar to the AC's General Capabilities, are embedded in the curriculum guidance. For example, these develop multiliteracy and language awareness and build students' linguistic identities. Many of these provide a context for learning aspects of the AC: E, particularly in the choice of texts, where texts are selected not only for the language forms and features they include but also because they address issues which support the personal development or socio-cultural awareness of the students. At the level, Finnish students are becoming increasingly aware of different languages and they learn to see culture as enriching.

Critical and creative thinking in the AC or Thinking and Learning-to-learn in the FNCC are implicit in the learning of English. A fundamental understanding of language at Year 6 level includes recognising how language is used in texts to affect the message of the text. Speaking and listening competences at this level, which would support the development of transversal competences, include discussions of texts or debates.

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: English (AC: E)

Finnish National Core Curriculum: Mother Tongue and Literature (FNCC: MTL)

Expectations: Knowledge and Skills

Both the Finnish and Australian curricula maintain overarching organisational elements and key foci stemming from the learning that builds on and strengthens concepts, skills and processes developed in earlier years. For example, the AC continues to develop students' knowledge and understanding in the three interrelated strands of *Language*, *Literature* and *Literacy*; this is achieved through a methodical emphasis on listening, reading, viewing, speaking, writing and creating. The FNCC organises content areas around objectives relating to language and literature.

The emphasis on language and literacy skills remains prominent in both curricula. However, the AC: E Year 10 shifts the emphasis away from the development of core literacy skills towards the study of literature for its intrinsic, aesthetic value as well as for its contribution to understanding human behaviour, cultures and global philosophical and real-world dilemmas. This change in emphasis reflects the expectation that students will have mastered most essential literacy skills such as spelling, punctuation and paragraphing. It also reflects the perspective that, in the middle secondary years, the English curriculum should concentrate on the study of English as a discrete academic discipline rather than simply being responsible for equipping students with literacy skills.

The FNCC (FNBE, 2016) focuses strongly on developing linguistic and cultural skills in “diverse communication environments” in which students are “guided to act in different interactive situations and multimedia environments so that they perceive themselves as communicators and can, for their part, work to promote a positive communication atmosphere”. There is a strong focus on the capacity to “diversify multiliteracy and learning-to-learn and interaction skills”. Students expand their “linguistic and cultural knowledge as well as their textual world”. They are encouraged to act in different interactive situations and multimedia environments to strengthen their communication skills. Students “make judgements and justify their viewpoints” and “influence their own lives and the surrounding society by utilising different communication devices”. Text selection is more oriented towards topics about society, work, and further study. Students develop their literary analysis and interpretation skills, and they are encouraged to read widely and expand their literature interests.

By Year 10, Australian students' knowledge and understanding of language enables them to comprehend and create a comprehensive range of imaginative, informative and persuasive texts, in different forms, using various technologies. At this stage of their schooling, students are expected to be able to construct sustained texts for a range of purposes on challenging and complex issues. Their writing should reflect an emerging sense of personal style, use of appropriate structure and the application of language and literary devices and features designed specifically for the intended audience.

A key feature of the AC for Year 10 students is around the influence of culture and perspective on language. Skills and knowledge are drawn together through the critical analysis of text; this is intended as a lens through which students consider their society and culture and those of others.

Although present in the AC, the provision of student support and guidance is more pronounced in the FNCC (FNBE, 2016), especially with regard to students possessing “possible linguistic learning difficulties, learning of concepts, and verbalising their thoughts”. The FNCC’s English materials remind teachers to support diverse learners:

Linguistically talented pupils are also supported in taking on reading challenges, finding working practices appropriate for them, and setting goals. Texts and working methods are selected to ensure the equity and gender equality among the pupils (FNCC: FNBE, 2016, p. 213).

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

The extent of content covered in the AC: E Year 10 is considered **comprehensive**. By the end of Year 10, students understand and create a range of multimodal texts for clearly defined purposes and they investigate and evaluate a range of texts which enable them to expand their knowledge and form opinions on a range of real world and imaginary topics. In Year 10, there are twelve content descriptions in the Language strand, with most of these building on knowledge and understandings from previous years. The number of content descriptions in the Literature strand has expanded to ten, reflecting the increased emphasis on analysing, appreciating and critiquing literature in the secondary curriculum. These content descriptions follow a developmental path throughout the primary years, as students broaden and deepen their understanding of the structure, features, devices and purposes of literary texts and use this expanded knowledge to create their own texts. Eleven Literacy content descriptions describe how students are able to apply the increasingly sophisticated skills from the Language strand to listen to, read, comprehend and create texts, both using conventional and digital tools.

FNCC – Breadth

Breadth: Comprehensive

Although the FNCC may not contain the same level of detail and philosophical underpinning as the AC at this exit point, the Finnish curriculum for Grades 7-9 continues the developmental continuum of learning that consolidates and strengthens concepts, skills and

processes developed in Grades 3-6. It targets key content areas related to the objectives of the syllabus that are comparable with the content areas of the three strands of the AC. In Grades 7–9, the aim is to expand students' linguistic and cultural knowledge as well as their textual world. There is an emphasis on language and interaction skills needed for further studies and working life, and students extend their literary analysis and interpretation skills, and are encouraged to read more widely and expand their literature repertoire. They write and produce diverse texts, working from a basis of strength and development as a producer of text. Grade 7-9 students become familiar with the “linguistic and cultural diversity in Finland and the history and the features of the Finnish language”; moreover, each “reflects on the meaning of the mother tongue and becomes aware of his or her own linguistic and cultural identity”, all of which is designed to help him or her to become an “active user and creator of culture” (FNBE, 2016). This is very powerful language. Based on the breadth of the expectations, the FNCC is considered **comprehensive**.

AC – Depth

Depth: Challenging

Based on the core content that is considered foundational to students' success at secondary school level, the AC: E is deemed to be **challenging**. The AC: E Year 10 builds on the knowledge and skills developed in previous years and deepens and expands conceptual understandings about language and literature. By Year 10, the AC: E requires students to analyse and critique a range of quality literary, media and digital texts that provide insights into society, culture and politics. This is achieved through deep knowledge of structures, forms and devices. By Year 10, students are analysing complex English concepts such as *intertextuality* and *voice*, involving application of deep, specialised knowledge.

FNCC – Depth

Depth: Challenging

Although the broad and generalist nature of the learning objectives may appear limiting, the FNCC (FNBE, 2016) engages students in deep learning that is **challenging** and promotes “independent and participating citizens” capable of justifying their viewpoints and influencing their own lives and others by “utilising different communication devices”. By Grade 9, Finnish students expand their skills base and master spoken and written language that will prepare them for further studies and their working life. They develop strategies and metacognitive skills inherent in understanding, comprehending and analysing texts. They develop analytical and critical literacy “to practise making observations from texts and interpreting them using appropriate concepts and to establish and expand vocabulary”. They develop skills for evaluating sources and for using information appropriately. The FNCC (FNBE, 2016) also encourages students to deepen their understandings of linguistic and cultural knowledge as well as their textual world. For example, they expand their knowledge of fictional text and literary genres “to diversify their reading, listening, and viewing experiences and the ways of sharing them, and to deepen the understanding of the elements of fiction” (FNBE, 2016).

AC – Rigour

Rigour: Challenging

The level of rigour expected in the AC: E is evident in the encouragement to students to produce a broad range of sustained texts that present well-reasoned arguments and respond to counter-arguments. Students create texts about **challenging** academic concepts or issues from multiple perspectives, including referring to different cultural perspectives and focusing on the Asian region. In the AC, there is an expectation that students' written texts will be expansive and complex, and that they will have an impact on the reader.

FNCC – Rigour

Rigour: Challenging

As in Grades 3-6, the FNCC: MTL describes learning that is rigorous and **challenging** in relation to language, literature and culture. This is enhanced by opportunities for students to deepen their understandings of linguistic and cultural knowledge as well as their textual world. As part of the curriculum continuum, the FNCC at Grades 7-9 focuses on the development of concepts, skills and processes developed in Grades 3-6. In keeping with the aims of the FNCC: MTL, students in Grades 7-9 are encouraged to expand their linguistic and cultural skills in diverse communication environments. In Grades 7-9, there is a shift towards further developing students' plurilingual competence, comprising competences of different levels in mother tongues, other languages and dialects. In different situations, students draw on language to strengthen language awareness and parallel use of different languages, in addition to developing multiliteracy. They apply the concepts of language knowledge in interpreting texts and utilise "diverse ways of language learning" (FNBE, 2016). They apply their skills in different languages in ways that support all learning in different subjects. Embedded in the curriculum guidance is a fostering of awareness of individuals' multi-layered linguistic and cultural identities, together with a growing understanding of minority languages and endangered languages.

Comparative Analysis

The two curricula are quite similar in their philosophical intent and purpose. The FNCC focuses on the holistic development of the individual student and preparation for work and life after school, by providing the necessary tools as well as offering experiences related to language and literature. This approach is grounded in the understanding that "knowledge about language, literature, the media and other forms of culture is acquired while the pupils develop their language proficiency and examine the meanings of texts" (FNBE, 2016). Similarly, the AC: E follows a developmental path throughout Foundation to Year 10, as students broaden and deepen their understanding of the structure, features, devices and purposes of literary texts and use this expanded knowledge to create their own texts.

Expectations of strong language and literacy skills are prominent in both curricula. While some of the content is similar to aspects of the AC, the expected outcomes tend not to be as well defined for the FNCC. For example, the AC describes the type of critical thinking and the contexts in which this would be applied. "Students refine their skills across all language modes by "engaging critically and creatively with texts" (ACARA, 2017e).

Both curricula are built on the implicit understanding that students have, by this stage, become reasonably independent writers. Instruction centres on writing techniques that allow students to craft and refine their writing for particular purposes. The AC emphasises the production of a broad range of texts that offer sound arguments and respond to counter-arguments. In the AC, there is an expectation that students' written texts will be expansive and complex, and that they will have an impact on the reader. By comparison, the FNCC encourages the study of textual, visual and linguistic features of narrative, descriptive, instructive, and especially reflective and argumentative texts, and the demonstration of this knowledge when producing these texts. Although students are expected to observe the conventions of writing when producing their texts, there is also a requirement to refine their skills in producing texts across other academic disciplines. This could include writing summaries and notes, with the use of citations. Students are expected to comply with copyright and other relevant restrictions when producing their own texts.

A distinguishing feature of the FNCC across all grades is the growing understanding of the meaning and status of the Finnish language, literature and other forms of culture in a multicultural and plurilingual society. While Australia is a multicultural society, the focus on language, literature and culture is not as pronounced in the AC, particularly as so few students have sustained exposure to foreign language learning.

b) Mathematics

Comparative Curricula

Australian Curriculum: Mathematics

Version 8.3, 2016

Finnish National Core Curriculum: Mathematics

Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2

Finnish National Core Curriculum: Grades 1-2

Learning Area/Subject

Australian Curriculum: Mathematics (AC: M)

Finnish National Core Curriculum: Mathematics (FNCC: M)

Expectations: Knowledge and Skills

The AC: M aims to be relevant and applicable to the 21st century by equipping students with the capacity to think, solve problems and respond to challenges. The inclusion of the proficiencies of understanding, fluency, problem-solving and reasoning in the curriculum enables students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently. The proficiencies define the range and nature of expected actions and applications in relation to the content descriptions. The proficiencies are an integral part of Mathematics content across the three content strands: *Number and Algebra*, *Measurement and Geometry*, and *Statistics and Probability*. They reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They also provide the language to build in the developmental aspects of the learning of Mathematics and outline the expectations of the teaching of mathematical content in Year 2.

At this year level:

- **understanding** includes connecting number calculations with counting sequences, partitioning and combining numbers flexibly and identifying and describing the relationship between addition and subtraction and between multiplication and division
- **fluency** includes readily counting numbers in sequences, using informal units iteratively to compare measurements, using the language of chance to describe outcomes of familiar chance events and describing and comparing time durations
- **problem-solving** includes formulating problems from authentic situations, making models and using number sentences that represent problem situations, and matching transformations with their original shape
- **reasoning** includes using known facts to derive strategies for unfamiliar calculations, comparing and contrasting related models of operations and creating and interpreting simple representations of data.

In the AC: M, Foundation to Year 2, content is incorporated across three strands: *Number and Algebra*, *Measurement and Geometry*, and *Statistics and Probability*. By the end of Year 2, students count to and from 1000, recognise increasing and decreasing number

sequences and identify the missing element in a number sequence. They perform simple addition and subtraction calculations using a range of strategies and represent multiplication and division by grouping into sets. They learn to divide collections and shapes into halves, quarters and eighths and sum collections of Australian coins to their value. Students learn to order shapes and objects using informal units. They are required to tell time to the quarter-hour and use a calendar to identify the date and the months included in seasons. They draw two-dimensional shapes, recognise some of the features of three-dimensional objects, explain the effects of one-step transformations and interpret simple maps of familiar locations. Students use the language of chance to describe outcomes of familiar chance events. They collect, organise and represent data to make simple inferences and draw reasonable conclusions.

The AC: M incorporates the General Capabilities, focusing particularly on Numeracy. The three Cross-curriculum Priorities in the AC (Aboriginal and Torres Strait Islander Histories and Cultures, Asia and Australia's Engagement with Asia and Sustainability) are also referenced in the elaborations for AC: M Foundation to Year 2.

Finland's curriculum design begins from the premise that students will aim for *mastery learning* and the expectations are evident in the key content areas. The FNCC: M (FNBE, 2016, p. 175) expects that the subject will be "studied in a functional manner, using various tools" and "mastering the basics is a necessary precondition for learning new contents".

In the FNCC: M, the learning for Grades 1-2 is structured into two sections. The first, Objectives of Instruction, addresses three areas in the context of Mathematics: Significance, values and attitudes; Working skills; and Conceptual objectives and objectives specific to the field of knowledge. The second section – Key Content areas related to the objectives of Mathematics in Grades 1-2 – begins with C1: Thinking skills, which aligns with the first transversal competence – Thinking and learning to learn (T1), and describes the development of processes of comparing, classifying, ordering and identifying causal relationships in their observations. This area requires formulation and testing of step-by-step instructions as a basic idea to prepare for programming. C2-4 are more conventional content *strands*, containing *Numbers and operations*, *Geometry and measuring*, and *Data processing and statistics*, which parallel the three content strands in the AC: M.

By the end of Grade 2, pupils count, perceive and estimate quantities using natural numbers. They compare and order numbers and use them appropriately to express quantity and measurement results. Pupils gain an understanding of the decimal system and develop addition and subtraction skills in the range 0-100 using a range of mental arithmetic strategies including the commutative and associative properties for addition. Pupils learn the multiplication tables 1-5 and 10. The concept of a fraction is introduced with the division of an entity into equal parts. Pupils use the concepts of direction and location. They examine both three-dimensional objects and plane figures, identifying, building and drawing them, and finding and naming properties used to classify them. Pupils measure length, mass and volume using appropriate formal units of measurement (m, cm, kg, g, l, dl) as well as time on a clock. They collect and store information and then draw and interpret simple tables and bar graphs.

The section titled *Guidance, differentiation, and support in mathematics* recognises the cumulative nature of Mathematics and systematic support is provided to improve students' skills "while maintaining the joy of learning and knowing" (FNBE, 2016). Students who demonstrate particular interest and ability are given additional opportunities to gain a deeper understanding of the contents covered in Grades 1-2.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

The AC: M covers a diverse number of topics indicative of the nature of this learning area. The concepts and skills of AC: M allow learners to build on the previous learning in Foundation and Year 1 as they develop their number and spatial skills and their ability to interpret data. In terms of breadth of coverage, the expectations of the AC are considered to be **comprehensive**. There are 25 content descriptions across the three strands of *Number and Algebra, Measurement and Geometry and Statistics and Probability*. Under these strands, the content is further organised into threads:

Number and Algebra

- Number and place value (7 content descriptions)
- Fractions and decimals (1 content description)
- Money and financial Mathematics (1 content description)
- Patterns and algebra (2 content descriptions)

Measurement and Geometry

- Using units of measurement (5 content descriptions)
- Shape (2 content descriptions)
- Location and transformation (3 content descriptions)

Statistics and Probability

- Chance (1 content description)
- Data representation (3 content descriptions) (ACARA, 2017f).

There are also 42 elaborations which, although not mandatory, offer teachers some insight into how the content can be presented to students. These elaborations provide examples and teaching points to develop a common understanding of the expectation of what is to be taught. There are one or more elaborations aligned to each content description.

Table 3. 6 *Number of content descriptions in AC: M, Year 2*

Year 2	Mathematics
Content descriptions	25
Elaborations	42
General capabilities	5
Cross-curriculum priorities	3

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 2, the expectations of the FNCC: M are considered **comprehensive** in relation to breadth of coverage. The FNCC: M offers the students learning experiences that form the basis for the development of further mathematical concepts. The content lays a strong foundation for the areas of number, measurement and data. The key content areas of C1 *Thinking skills*, C2 *Numbers and operations*, C3 *Geometry and measuring* and C4 *Data processing and statistics* cover a range of content appropriate for students at this level as the basis for further learning.

AC – Depth

Depth: Challenging

The expectations of the AC: M in terms of depth are **challenging**. Within each of the strands of Number and Algebra, Measurement and Geometry and Statistics and Probability, the sub-strands determine further detail of the requirements for learning. The year-level descriptions for Year 2 reveal significant cognitive demand by referring to the proficiencies contained in the content descriptions. For example, the proficiency of *Understanding* includes building robust knowledge of adaptable and transferable concepts, and in Year 2 this is evident in students making connections, partitioning and combining numbers and identifying and describing the relationships between the four number operations. Additionally, *Fluency* includes choosing appropriate procedures which can be carried out flexibly, and at this year level the proficiency implies counting numbers in sequences, using informal units iteratively to compare measurements and describing outcomes of familiar chance events making comparisons. These statements define the range and nature of the expected actions in relation to the content descriptions. The depth of curriculum at Year 2 is exemplified by the verbs used to describe the knowledge and skills contained within the content descriptions. These verbs describe expectations ranging from the less demanding *recognise*, *describe* and *identify* to the higher-order *create*, *investigate* and *compare*.

FNCC – Depth

Depth: Fundamental

For students in Grade 2, the overall expectations of the FNCC: M are considered **fundamental** in relation to depth of coverage. The expectations regarding the level of student understanding of the mathematical concepts are not articulated in the documentation. The content areas mostly contain statements about the expected content to

be learnt. In particular, the statement under C2 *Numbers and operations* (FNBE, 2016) that “Operations are performed using natural numerals” offers no guidance as to what operations nor for the size of the numerals on which these operations are performed. In the same content area, students are required to “familiarise themselves with the principles of the decimal system using concrete models” but the principles of the decimal system and the extent of the depth of the understanding that is required are not explicitly mentioned. In C3 (Geometry and measuring) (FNBE, 2016), the expectation is that “pupils practise using the concepts of directions and location” but there is no indication of which directions are intended nor whether students should be able to use a compass and interpret a map.

AC – Rigour

Rigour: Challenging

The level of rigour in the AC: M is **challenging** as it places a considerable demand on students to engage in reasoning and problem-solving. Problem-solving requires students to make choices, investigate problem situations and communicate their thoughts. Reasoning develops the capacity for logical thought and actions, such as explaining answers and the processes of solving problems. This is reflected in the year-level statement at the beginning of the curriculum which identifies how the problem-solving and reasoning proficiencies are embedded in the curriculum to provide the level of rigour expected. In Year 2, the AC: M states that problem-solving includes “formulating problems from authentic situations”, representing problems by modelling and matching, and reasoning “includes using known facts to derive strategies for unfamiliar calculations, comparing and contrasting related models of operations and creating and interpreting simple representations of data” (FNBE, 2016). These problem-solving and reasoning skills are contained in the achievement standard at Year 2, which describes what a typical student is expected to achieve by the end of Year 2. The achievement standard requires students to *interpret, explain* and *make inferences*, all of which require higher-order thinking skills and rigorous learning.

FNCC – Rigour

Rigour: Moderate

The information presented in the Objectives of Instruction and Content Areas of the FNCC: M indicate a **moderate** degree of rigour. For Grades 1-2, the FNCC: M does not offer definitive expectations of student achievement. Hence, this judgement about the level of rigour is solely based on the descriptions of *Objectives of Instruction, Content Areas* and *Transversal Competences*. The O4 Objective of instruction under the heading *Working Skills* is “to guide the pupil to develop his or her reasoning and problem-solving skills”. However, the content area statements are not specific about the expectations. At Grades 1-2, the FNCC: M focuses on stimulating the students “to understand the usefulness of Mathematics in their own lives and more broadly in society” and for students to “take responsibility for their learning” (FNBE, 2016). These goals are not reflected in explicit ways in the content areas, objectives and transversal competences, placing considerable reliance on teachers to cater for the ability of the students.

Comparative Analysis

The Finnish curriculum goes to considerable lengths to promote Mathematics as an essential part of students' learning, referring to this learning area as "a goal-oriented and persistent pursuit where the pupils take responsibility for their learning" (FNBE, 2016). The stated intention of FNCC: M is to support "the pupils' positive attitude towards Mathematics and their positive self-image as learners of the subject ... [and to develop] their communication, interaction, and cooperation skills" (FNBE, 2016). Similarly, the AC: M aims to ensure that students are:

... confident, creative users and communicators of Mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens; develop an increasingly sophisticated understanding of mathematical concepts and fluency with processes, and are able to pose and solve problems and reason in number and algebra, measurement and geometry, and statistics and probability; and recognise connections between the areas of Mathematics and other disciplines and appreciate Mathematics as an accessible and enjoyable discipline to study (ACARA, 2017f).

Both curricula articulate the importance of Mathematics in a broad education and its contribution to students' post-school life.

The AC: M and the FNCC: M are quite comparable in their development of mathematical concepts and skills in the early years of schooling. There are some differences in content coverage, with the AC including number sequences, summing the value of collections of Australian coins, using the calendar, one-step transformations in geometry and the language of chance. The FNCC: M includes more work on multiplication with times tables and the use of standard units in measurement. Both curricula recognise the importance of the concrete and pictorial stages in establishing sound understanding of Mathematics.

The AC: M uses the three strands of *Number and Algebra*, *Measurement and Geometry*, and *Statistics and Probability* as the organisers of the knowledge and skills that students are expected to learn. In the AC: M, the key ideas are the proficiency strands of *understanding*, *fluency*, *problem-solving and reasoning*. The proficiency strands describe the actions in which students can engage when learning and using the content. While not all proficiency strands apply to every content description, they indicate the breadth of mathematical actions that teachers can model. The elaborations are not mandatory, but they do provide examples of context and content. The AC: M also provides a Glossary linked to terms within the curriculum content, giving teachers concise definitions to clarify particular mathematical concepts.

The description of content in the two curricula differs significantly. The AC: M uses verbs to describe what students should be able to do as a result of their studies and the FNCC: M states what is to be taught. The content is identified in sentences in Key content areas related to the objectives of Mathematics in Grades 1-2. The depth and rigour of the FNCC: M tend to be more obviously reliant on teacher practice and the ways in which the statements are incorporated into the transversal competences. The example below describes the difference in the way the same content is represented in each curriculum:

AC: M

- Identify a question of interest based on one categorical variable. Gather data relevant to the question
- Collect, check and classify data
- Create displays of data using lists, tables and picture graphs and interpret them.

FNCC: M

- The pupils begin to develop their ability to collect and store information on interesting topics
- The pupils draw and interpret simple tables and bar graphs.

In the FNCC, the Objectives of Instruction, Content Areas and Transversal Competences are largely written as guidance for teachers, regarding the type of learning experiences they ought to provide for students. The AC content is written in the form of descriptions of what students are expected to learn. For Finnish practitioners, the role of the teacher as a facilitator of students' learning is emphasised through the wording of the objectives, which tend to start with phrases such as *to guide/support/encourage pupils to...* or *to offer the pupil opportunities to...* No elaborations or further explanations are provided to explicate the intent of the curriculum, so determination of depth and rigour are dependent on the expertise of the teacher to determine the approach. The broad nature of the descriptions encourages teachers to provide an individual programme of learning to meet the needs of their students.

The achievement standards in the AC: M, used for reporting purposes, indicate the expectation of a typical student at the end of Year 2. The standards detail which aspects of the content descriptions and proficiencies should be assessed and reported. For example, under Number and Algebra the expectations are that:

By the end of Year 2, students recognise increasing and decreasing number sequences involving 2s, 3s and 5s. They represent multiplication and division by grouping into sets. They associate collections of Australian coins with their value. Students identify the missing element in a number sequence... Students count to and from 1000. They perform simple addition and subtraction calculations using a range of strategies. They divide collections and shapes into halves, quarters and eighths (ACARA, 2017f).

Under Number and Algebra, the FNCC describes the key targets of assessment and feedback as “progress in understanding the concepts of numbers and in number sequencing skills, progress in understanding the decimal system, and progress in the fluent use of arithmetic skills” (FNBE, 2016). The FNCC's expectations can thus be seen as much broader than those of the AC: M.

Additional Observations

Finnish students complete pre-primary education in Mathematics prior to starting school, and they start formal schooling at the age of seven, making them one year older than their

Australian peers when they begin Year 2 / Grade 2. This may be one explanation for their more advanced status in several key areas, such as mastery of multiplication tables and the use of standard units for measurement.

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: Mathematics (AC: M)

Finnish National Core Curriculum: Mathematics (FNCC: M)

Expectations: Knowledge and Skills

The AC: M incorporates content across the three strands of *Number and Algebra*, *Measurement and Geometry* and *Statistics and Probability*. The curriculum is presented in a sequence of separate years. By the end of Year 6, students recognise the properties of prime, composite, square and triangular numbers. They describe the use of integers in everyday contexts and solve problems involving all four operations with whole numbers. They are introduced to negative numbers through practical applications in areas such as temperature. Students connect fractions, decimals and percentages as different representations of the same number and solve problems involving the addition and subtraction of related fractions. Students make connections between the powers of 10 and the multiplication and division of decimals. They add, subtract and multiply decimals and divide decimals where the result is rational and locate fractions and integers on a number line. They calculate a simple fraction of a quantity. Students calculate common percentage discounts on sale items. They write correct number sentences using brackets and order of operations. They describe rules used in sequences involving whole numbers, fractions and decimals. Students locate an ordered pair in any one of the four quadrants on the Cartesian plane. Students connect decimal representations to the metric system and choose appropriate units of measurement to perform a calculation. They construct simple prisms and pyramids and make connections between capacity and volume. They solve problems involving length and area. They interpret timetables. Students describe combinations of transformations. They solve problems using the properties of angles. Students compare observed and expected frequencies and interpret and compare a variety of data displays, including those displays for two categorical variables. They interpret secondary data displayed in the media and describe probabilities using simple fractions, decimals and percentages.

For students in Grades 3-6, the FNCC: M is designed as a single entity, divided into two sections. The first section, Objectives of Instruction, addresses three areas in the context of Mathematics: Significance, values and attitudes; Working skills, and Objectives of instruction. The Working skills area outlines the processes of understanding connections, developing skills in posing questions, making reasoned conclusions based on observations, presentation of solutions using a variety of forms including ICT, developing problem-solving skills, assessing whether a solution is reasonable and meaningful, as well as particular general mathematical objectives. The section containing the Objectives of instruction lists five content-related goals and includes details about the formulation of computer programs

for graphic programming. All objectives are cross-referenced to the FNCC's transversal competences and to the Key Content areas which follow.

The second section, Key Content areas related to the objectives of Mathematics in Grades 3-6, begins with C1: Thinking skills. There is clear alignment with the first transversal competence of Thinking and learning to learn (T1), and clear description of the development of processes of comparing, classifying, ordering and identifying causal relationships and connections in Mathematics as well as the planning and executing of graphic programming. The remaining four content areas parallel the AC's content strands, except that Numbers and operations is separate from Algebra. By the end of Grade 6, it is 'ensured' that pupils master the 1-10 multiplication tables and the multiplication algorithm. Division is understood and practised both as quotient and partition. Understanding the number system is expanded to negative integers. Pupils calculate with approximate values to estimate reasonable results. Pupils add and subtract fractions and multiply and divide them by natural numbers. They practise basic operations with decimal numbers, calculate with percentages in simple examples and use the connections between fractions, decimals and percentages. Pupils solve equations by trial and error and reasoning. In geometry they classify and examine the properties both of plane figures and solids including cones and pyramids. They draw, measure and classify angles. They study the three symmetries, enlargements and reductions using the concept of scale, also used in working with maps. Pupils use the four quadrants of the coordinate plane. Pupils use the metric system to calculate the circumference and area of a variety of plane figures, and the volume of rectangular prisms, mindful of accuracy, using estimation and verification. Conversion between common metric units is required. In statistics, they are introduced to least and greatest values, mean and mode. Pupils become familiar with the language of probability.

The AC: M takes account of the General Capabilities and specifies the contribution made by the learning area of Mathematics to the knowledge, skills, behaviours and dispositions needed in the 21st century. These are identified by appropriate icons both in content detail and exemplary elaborations. They comprise Literacy, Numeracy, Information and Communication Technology (ICT), Critical and Creative Thinking, Intercultural Understanding and Personal and Social Capacity. The AC's three cross-curriculum priorities of Aboriginal and Torres Strait Islander Histories and Cultures, Asia and Australia's Engagement with Asia and Sustainability are also referenced in some of the elaborations for AC: M in Year 6.

The FNCC: M refers to the Transversal Competences which underpin the whole FNCC and comprise the knowledge, skills, values, attitudes and will required to become a functioning member of Finland's democracy. These are *Thinking and learning to think*, *Cultural competence and self-expression*, *Taking care of oneself and managing daily life*, *Multiliteracy*, *ICT Competence*, *Working life competence* and *entrepreneurship and Participation, involvement and building a sustainable future*. Transversal Competences are aligned to each Object of instruction to assist teachers to support a student's self-knowledge, self-respect and the formation of personal identity. The FNCC: M identifies the particular Transversal Competences to which the Mathematics curriculum can make a contribution.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

With regard to topic coverage, the expectations of the AC: M are **comprehensive**. They incorporate 25 content descriptions across the three strands of *Number and Algebra*, *Measurement and Geometry* and *Statistics and Probability*, and under those strands, the content is further organised into threads:

Number and Algebra

- Number and place value (3 content descriptions)
- Fractions and decimals (7 content description)
- Money and financial Mathematics (1 content description)
- Patterns and algebra (2 content descriptions)

Measurement and Geometry

- Using units of measurement (5 content descriptions)
- Shape (1 content description)
- Location and transformation (2 content descriptions)
- Geometric reasoning (1 content description)

Statistics and Probability

- Chance (3 content descriptions)
- Data representation (2 content descriptions).

Elaborations, although not mandatory in the AC: M, provide additional information for teachers with teaching ideas, links to the general capabilities and cross-curriculum priorities and further clarification of the content description. One or more elaborations will be linked to each content description in Year 6.

The content contained in Year 6 builds on the content from Foundation through to Year 5 under the three content strands. The sequential nature of the AC: M is a design feature that implies that concepts are developed each year and become more sophisticated as students progress through the years of schooling.

Table 3. 7 *Number of content descriptions in AC: M, Year 6*

Year 6	Mathematics
Content descriptions	27
Elaborations	46
General capabilities	5
Cross-curriculum priorities	3

FNCC – Breadth

Breadth: Comprehensive

For students in Grades 3-6, the FNCC: M comprises five key content areas: Thinking skills, Number and operations, Algebra, Geometry and measurement, and Data processing and software, statistics, and probability. These content areas are preceded by nine Objectives of instruction relating to mathematical attitude, working skills and concept development, providing a breadth of coverage. All content is described in broad sentences covering a range of areas.

Teachers emphasise thinking skills as an overarching theme of the FNCC: M. These skills have students “finding similarities, differences, regularities” and “searching for alternatives, observing causal relationships and connections” (FNBE, 2016). The area of Number operations includes understanding the decimal system, examining numbers to find the connections between number structure and divisibility. Students are required to perform mental arithmetic, addition and subtraction algorithms, mastery of multiplication tables and hence confidence in division and partitioning of numbers. Students develop their estimation skills as they become confident in the use of the four operations and make connections between fractions, decimals and percentages.

By the end of Grades 3-6, students are introduced to the concepts of an unknown and solve equations by informal methods. They become familiar both with two-dimensional shapes and three-dimensional objects and perform calculations using the appropriate units for area, perimeter and volume. Students learn about angles by drawing, measuring and classifying them. They learn both about rotational and translations symmetry and use maps and the first quadrant of the Cartesian Plane to locate position. Students are required to develop skills in collecting and recording data and then calculating range and mode. They also evaluate the likelihood of an event in everyday situations. Therefore, based on content coverage, skills and concept development, the depth of the FNCC: M is considered **comprehensive**.

AC – Depth

Depth: Challenging

In relation to depth in Year 6, the AC: M is regarded as **challenging**. Within each of the strands of *Number and Algebra*, *Measurement and Geometry* and *Statistics and Probability*, the sub-strands provide further detail. The year-level descriptions at the beginning of the AC: M Year 6 show a range of cognitive demand, and the understanding and fluency proficiencies describe the depth of the curriculum. *Understanding* includes building robust knowledge of adaptable and transferrable concepts and in Year 6 this is evident in students describing connections and making reasonable estimations. *Fluency* involves choosing appropriate procedures which can be carried out flexibly, and at this year level implies students being able to represent, convert and interpret mathematical concepts. Students are required, after being taught the content, to describe connections between concepts they have learnt and represent their knowledge in various ways. The verbs used to describe the knowledge and skills contained within the content descriptions range from *select* and *describe* to higher order verbs of *create*, *interpret* and *compare*. The use of these verbs, as

included in the content descriptions, requires considerable in-depth exploration of concepts and justifies the classification of 'challenging'.

FNCC – Depth

Depth: Fundamental

The FNCC: M states that “instruction is founded on topics and problems that are familiar and of interest to the pupils” and that “pupils continue to learn Mathematics in an environment where a concrete approach and tools are essential” (FNBE, 2016). The depth of the content with which students will engage in learning is not clear in the documentation. The design of the FNCC: M allows for rich and deep learning but is reliant on the ability of teachers to provide learning programs to provide the skills and understandings which are described in the Key content areas. Evidence of these opportunities for depth is captured in phrases such as “observing causal relationships and connections in Mathematics” (FNBE, 2016).

AC – Rigour

Rigour: Challenging

The level of rigour of the AC: M is deemed to be **challenging** as it places considerable demand on students to engage in reasoning and problem-solving. The year-level statement for Year 6 specifies that problem-solving includes formulating and solving authentic problems, interpreting secondary data displays and finding unknown angles. The rigorous expectations are further exemplified by the reasoning description which includes explaining mental strategies for performing calculations, describing results for continuing number sequences, explaining transformations and why the results of chance experiments may differ from expected results. The content descriptions at Year 6 require higher-order thinking skills. This is evident in the language used to describe the content description. For example, students are required to “interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables” and also to “Interpret secondary data presented in digital media and elsewhere” (ACARA, 2017f). These are demanding skills for students at this level. The content descriptions define the expectations of the students to be able to do more than procedural calculations and computations. The verbs used at the beginning of each content description imply higher-order thinking. Verbs and phrases such as *investigate and calculate, continue and create, explore the use of, interpret and use* and *investigate combinations* define the intent of the learning to be challenging and investigative.

The achievement standard defines the expectation of what a typical student is able to achieve by the end of Year 6. The Year 6 achievement standard explains that students are expected to be able to “solve problems involving all four operations”, “connect fractions, decimals and percentages, make connections between capacity and volume”, “interpret secondary data in the media” (ACARA, 2017f). This expectation assumes higher-order mathematical thinking, which supports the classification of 'challenging'.

FNCC – Rigour

Rigour: Moderate

The classification of **moderate** for the FNCC: M is based on the relatively low volume of evidence of how students engage in abstract thinking and reasoning. In the section titled *Guidance, differentiation, and support* in Mathematics in Grades 3-6, the FNCC: M explains that “Talented pupils are supported by offering them alternative working approaches and by enriching the learning contents. The content areas may include the properties of numbers, different number sequences, geometry, creative problem-solving, and applications of Mathematics” (FNBE, 2016). This is the only reference to higher cognitive demand of mathematical content for more able students. Similarly, the assessment criteria for the end of Grade 6 do not describe higher order thinking skills. Statements such as “The pupil masters the principle of the decimal system” and “the pupil is able to execute mental and written arithmetic operations quite fluently” indicate reliance on teachers to provide deep and rich learning suited to their classes and individual learners, always ensuring competence in fundamental skills and concepts.

Comparative Analysis

The AC: M Year 6 and the FNCC: M Grades 3-6 share many similarities in their content descriptions as well as their teaching and learning styles. The AC’s mathematical proficiency strands of *understanding, fluency, problem-solving and reasoning* are echoed in the Objectives of instruction and Thinking skills of the FNCC. The FNCC is not written to include prescriptive content descriptions, whereas the AC: M provides more detailed descriptions of content and includes, although not mandatory, elaborations to explicate further what is required of the learning of the content. The FNCC does not provide detail in the documentation to indicate the level of difficulty expected; rather, the assumption is that each student will engage in learning commensurate with his or her ability and motivation.

Both curricula have content that is not included in the other. The AC: M places a greater emphasis on Probability while the FNCC: M has more sophisticated expectations in Measurement. Content detailed in the AC: M that is not found in the FNCC: M is listed below:

Number and Algebra

Number and place value

- Identify and describe properties of prime, composite, square and triangular numbers
- Investigate everyday situations that use integers. Locate and represent these numbers on a number line

Fractions and decimals

- Compare fractions with related denominators and locate and represent them on a number line
- Solve problems involving addition and subtraction of fractions with the same or related denominators
- Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies

Patterns and algebra

- Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence
- Explore the use of brackets and order of operations to write number sentences

Measurement and Geometry

Units of measurement

- Interpret and use timetables

Location and transformation

- Introduce the Cartesian coordinate system using all four quadrants

Geometric reasoning

- Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles

Statistics and Probability / Chance

- Describe probabilities using fractions, decimals and percentages
- Compare observed frequencies across experiments with expected frequencies

Content contained in the FNCC: M that is not found in the AC: M is listed here:

Numbers and operations

- Connections between the structure and divisibility of numbers

Algebra

- The concept of the unknown and solution of equations by reasoning and experimentation

Data processing and software, statistics, and probability

- Statistical measures – least, greatest values, average and mode

Both curricula encourage the use of ICT in the teaching and learning of Mathematics. The AC: M identifies ICT in content descriptions such as “Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies” (ACMNA129) (ACARA, 2017f), whereas the FNCC has an over-arching statement that “learning is supported by utilising information and communication technology” (FNBE, 2016, p. 294).

Finnish students are reminded of their role in the acquisition of skills and knowledge, with curriculum statements such as “Studying Mathematics is a goal-oriented and persistent pursuit where the pupils take responsibility for their learning” taking a prominent position (FNBE, 2016). The AC: M speaks directly to the teacher, a professional who is responsible for the teaching and the learning that take place in the classroom. In another significant difference in approach, the FNCC: M also encourages students to take responsibility for their own assessment: “The pupils are guided to assess their own learning and to become aware of their strengths”. By comparison, the AC: M includes achievement standards which describe the understanding and skills required of students at the end of the learning year. Assessment criteria in the FNCC: M do not necessarily describe specific knowledge and skills, but they do offer broad statements that can be understood by any reader, such as “assessment targets include the pupil’s working processes, correctness of the solutions, and

his or her ability to apply the learned knowledge and skills” (FNBE, 2016). Students are also encouraged to work together in groups, with feedback helping them to appreciate the effort and development of each group member.

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: Mathematics (AC: M)

Finnish National Core Curriculum: Mathematics (FNCC: M)

Expectations: Knowledge and Skills:

At Year 10, there are significant differences between the AC: M and the FNCC: M. Australian students finish their compulsory years of schooling at Year 10 but Finnish students complete their compulsory years of schooling at Grade 9. Both curricula retain their structure, but they are quite different in their purpose. The AC: M maintains a design based on strands for all Year 10 students but also provides an optional, more challenging set of content descriptions for students planning to take on a calculus-based subject in Years 11 and 12. The FNCC: M expands the Key content areas related to the objectives of Mathematics in Grades 7-9.

The AC: M incorporates content across the three strands of *Number and Algebra*, *Measurement and Geometry* and *Statistics and Probability*. By the end of Year 10, students recognise the connection between simple and compound interest. They solve problems involving linear equations and inequalities and make the connections between algebraic and graphical representations of relations. Students expand binomial expressions and factorise monic quadratic expressions. They find unknown values after substitution into formulas and perform the four operations with simple algebraic fractions. Students solve simple quadratic equations and pairs of simultaneous equations. Students solve surface area and volume problems relating to composite solids and recognise the relationships between parallel and perpendicular lines. Students apply deductive reasoning to proofs and numerical exercises involving plane shapes. They use triangle and angle properties to prove congruence and similarity and use trigonometry to calculate unknown angles in right-angled triangles. Students list outcomes for multi-step chance experiments and assign probabilities for these experiments. They calculate quartiles and inter-quartile ranges and compare data sets by referring to the shapes of the various data displays. They describe bivariate data where the independent variable is time. Students describe statistical relationships between two continuous variables and evaluate statistical reports.

The FNCC: M expands the Key content areas under six headings, this being an increase from the five headings found in the earlier years. At the Grade 9 level, some of the headings change to reflect the higher order of the content. C1 is *Thinking skills and methods*; C2 and C3 remain the same as earlier years. C4 is the new key content area called *Functions*, C5 is *Geometry* and does not include measuring, and C6 contains *Data processing, statistics and probability* and omits software.

The AC: M is more prescriptive in its expectations of what students should learn. The FNCC: M is presented in more general terms; no expectations of the depth of learning are specified.

The AC offers more able and interested students the opportunity to undertake the 10A Mathematics curriculum, preparing them for the senior secondary Mathematics subjects.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For Year 10 students, the expectations of the AC: M are rated as **comprehensive**. They incorporate 25 content descriptions across the three strands of *Number and Algebra*, *Measurement and Geometry* and *Statistics and Probability*. Each content description is supported by at least one elaboration which provides clarity and teaching ideas to assist teachers. Under the strands, the content is further organised into threads:

Year 10

Number and Algebra

- Money and financial Mathematics (1 content description)
- Patterns and algebra (5 content descriptions)
- Linear and non-linear relationships (7 content descriptions)

Measurement and Geometry

- Using units of measurement (1 content description)
- Geometric reasoning (2 content descriptions)
- Pythagoras and trigonometry (1 content description)

Statistics and Probability

- Chance (2 content descriptions)
- Data representation (6 content descriptions) (ACARA, 2017f).

The 10A section of the AC contains content that prepares students for calculus-based senior courses in Years 11 and 12. Table 3.8 below provides the details.

Mathematics 10A

Number and Algebra

- Real numbers (2 content descriptions)
- Patterns and algebra (1 content description)
- Linear and non-linear relationships (4 content descriptions)

Measurement and Geometry

- Using units of measurement (1 content description)
- Geometric reasoning (1 content description)
- Pythagoras and trigonometry (4 content descriptions)

Statistics and Probability

- Chance (1 content description)
- Data representation (2 content descriptions) (ACARA, 2017f).

Table 3. 8 Number of content descriptions in AC: M, Year 10

Year 10	Mathematics	10A
Content descriptions	25	16
Elaborations	39	26
General capabilities	4	6
Cross-curriculum priorities	3	0

FNCC – Breadth

Breadth: Comprehensive

In Grades 7-9, the FNCC includes thinking skills and methods (C1) that underpin the mathematical learning and content contained in the content areas. The other four key content areas are C2: Numbers and operations, C3: Algebra, C4: Functions, C5: Geometry, and C6: Data processing, statistics and probability. Under each of these key content areas, statements in the form of a narrative outline the content; in each key learning area this is extensive and covers a broad range of topics. Although the content is expressed in broad terms, the understanding contained within each statement describes a varied amount of learning. In C6, for example, “pupils familiarise themselves with the concept of dispersion” (FNBE, 2016), and this reflects the standard of many of the five content descriptions contained in the Data representation of Year 10 AC: M.

AC – Depth

Depth: Challenging

The depth of learning expected in the AC: M for Year 10 students is deemed to be **challenging**. The concepts of fluency and understanding, contained in the proficiencies, are embedded in the content and require students to engage with the mathematical concepts and ideas at a high level. Understanding requires students to have the confidence to use the familiar to develop new ideas, and fluency implies carrying out procedures flexibly, accurately and recalling factual knowledge and concepts readily. The year-level descriptions at the beginning of the Year 10 AC: M demonstrate a range of cognitive demand. They include “using algebraic and graphical techniques to find solutions to simultaneous equations and inequalities” and “formulating geometric proofs involving congruence and similarity” (ACARA, 2017f). The verbs used to describe the knowledge and skills contained within the content descriptions range from *select* and *describe* to higher-order verbs of *connect*, *interpret* and *compare*, showing the progression of student learning.

The depth of content in the AC: M 10A course is more demanding, extending the Year 10 material to develop deeper understanding of concepts as well as the capacity to solve complex problems.

FNCC – Depth

Depth: Fundamental

The FNCC: M explains that “instruction is founded on topics and phenomena of interest for the pupils as well as on problems related to them” (FNBE, 2016). The documentation is not explicit about the depth at which students are to engage with the content, but the design of the FNCC allows rich and deep learning that is reliant on the ability of teachers to ensure development of the skills and understandings described in the Key content areas. There is some evidence of these opportunities for depth in phrases such as “pupils deepen their algorithmic thinking” and “they practise determining the truth value of propositions” but there is no clarity as to which relationships and propositions and thus no guidance as to the depth of the engagement (FNBE, 2016).

AC – Rigour

Rigour: Challenging

The rigour of the AC: M curriculum is considered to be **challenging** as it places considerable demand on students to engage in reasoning and problem-solving. Solving problems includes the ability to *interpret, formulate, model* and *investigate* problems. Reasoning requires logical thought and actions such as *proving, explaining, inferring, justifying* and *generalising*. The year-level statement describes how both problem-solving and reasoning are evident:

- **Problem-solving** includes calculating the surface area and volume of a diverse range of prisms to solve practical problems, finding unknown lengths and angles using applications of trigonometry, using algebraic and graphical techniques to find solutions to simultaneous equations and inequalities and investigating independence of events
- **Reasoning** includes formulating geometric proofs involving congruence and similarity, interpreting and evaluating media statements and interpreting and comparing data sets (ACARA, 2017g).

The intention of the AC: M’s design is for teachers to deliver the curriculum through the proficiencies, with a particular emphasis on problem-solving and reasoning. To this end, the AC: M provides the opportunity for students to be challenged and to encounter problems that are unfamiliar. However, this is very reliant on teacher expertise and pedagogy.

The content descriptions at Year 10A require higher-order thinking skills. In Year 10, under Pythagoras and trigonometry, students “Solve right-angled triangle problems including those involving direction and angles of elevation and depression” (ACMMG245) but in the 10A content students “Apply Pythagoras’ Theorem and trigonometry to solving three-dimensional problems in right-angled triangles” (ACARA, 2017f). These are challenging content descriptions; students must develop sophisticated thinking skills to be able to work through such problems.

FNCC – Rigour

Rigour: Moderate

The classification of **moderate** for the FNCC: M is because there is little evidence of how students are to engage in abstract thinking and reasoning at this level. According to the section on Guidance, differentiation, and support in Mathematics in Grades 7- 9, “Talented pupils are supported by offering them alternative working approaches, such as different projects and problem-based research assignments on mathematical topics that are of interest to them” (FNBE, 2016). This is the only reference to the cognitive demand of the mathematical content for more able students. Similarly, the assessment criteria for the end of Grade 9 does not mandate higher-order thinking skills. Typical statements are “The pupil recognises real numbers and is able to describe their properties” and “The pupil is able to calculate the areas of plane figures and volumes of objects. The pupil masters conversions of units of area and volume” (FNBE, 2016). The rigour of the content presented to students is reliant on the expertise of the teacher to provide deep and rich learning.

Comparative Analysis

The AC: M for Year 10 students and the FNCC: M for Grade 9 share many similarities in their content descriptions. The AC’s mathematical proficiency strands of *understanding, fluency, problem-solving and reasoning* are echoed in the Objectives of instruction and Thinking skills of the FNCC. The FNCC: M is not written to contain prescriptive content descriptions whereas the AC: M provides more detailed descriptions of content and includes elaborations to support teachers’ work. The FNCC does not provide enough detail to indicate the level of difficulty to be expected.

The main area of difference between the two curricula is how the content is expressed. The AC: M includes an entire thread on Pythagoras Theorem and Trigonometry with eight content descriptions over the Years 9 and 10. The content descriptions and the related elaborations provide guidance and detail to assist teachers to develop the necessary concepts for understanding. By contrast, the FNCC: M in C5 describes the concept of Pythagoras Theorem and Trigonometry in one sentence: “They learn to use the Pythagorean theorem, the converse of the Pythagorean theorem, and trigonometric functions”. The learning that students would undertake would be heavily reliant on the teacher’s ability to provide a learning program that engages students and to provide them with the learning necessary to use this knowledge in further study.

Both curricula encourage the use of ICT in the teaching and learning of Mathematics. The AC: M identifies the use of ICT for particular content descriptions such as “Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies”(ACMNA229) (ACARA, 2017f), whereas the FNCC: M has an overarching statement that states “Information and communication technology, such as spreadsheets and dynamic geometry software, is utilised as a tool for teaching and learning as well as for producing, evaluating, and creativity”(FNBE, 2016).

c) Science

Comparative Curricula

Australian Curriculum: Science	Version 8.3, 2016
Finnish National Core Curriculum: Environmental Studies	Version 2016:5, 2014
Finnish National Core Curriculum: Biology	Version 2016:5, 2014
Finnish National Core Curriculum: Geography	Version 2016:5, 2014
Finnish National Core Curriculum: Chemistry	Version 2016:5, 2014
Finnish National Core Curriculum: Physics	Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2
Finnish National Core Curriculum: Grade 2

Learning Area/Subject

Australian Curriculum: Science (AC: S)
Finnish National Core Curriculum: Environmental Studies (FNCC: ES)

Expectations: Knowledge and Skills

The AC: S addresses conceptual, procedural and epistemic knowledge of the natural sciences in the form of three interrelated strands referred to as *Science Understanding* (SU), *Science Inquiry Skills* (SIS) and *Science as a Human Endeavour* (SHE). The SHE strand also includes knowledge about the impact of scientific developments on society and how society influences the direction of scientific research. Attitudes and dispositions towards Science are not specifically addressed in the year-level descriptions of the curriculum. At Year 2 level, the AC: S expects students to describe changes to objects, materials and living things, to identify that certain materials and resources have different uses and to describe examples of where Science is used in people's daily lives. With respect to Science Inquiry Skills, students are expected to pose and respond to questions about their experiences and to predict outcomes of investigations, to use informal measurements to make and compare observations, to record and represent observations and to communicate ideas in a variety of ways.

The FNCC addresses the learning area of Science through Environmental Studies (FNCC: ES), which is an integrated subject that covers content from the fields of Biology, Geography, Physics, Chemistry, and Health Education. At Grade 2, the FNCC: ES specifies the inclusion of Finland's seven Transversal Competences as well as six Content Areas and 15 Objectives of Instruction which are grouped into the three categories *Significance, values, and attitudes*, *Research and working skills* and *Knowledge and understanding*. The FNCC: ES includes viewpoints both of natural and human sciences and places strong emphasis on the ecological, cultural, social and economic dimensions of sustainable development, with a key objective being "to guide pupils to understand the impacts of choices made by humans on life and the environment" (FNBE, 2016). Students are provided with diverse and authentic learning experiences with a strong hands-on focus that is intended to support the development of their environmental awareness, conceptual understanding and Science inquiry skills.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 2, the expectations of the AC: S are **comprehensive** with respect to breadth of coverage. The content descriptions address four topics in the Science Understanding strand, relating to one fundamental concept from each of the four disciplines of Biology, Chemistry, Earth and Space Science, and Physics, six Science Inquiry Skills and two concepts relating to Science as a Human Endeavour. The topics in the SU strand cover the developmental stages of living things, material combinations and their uses, Earth’s resources and their uses, and factors affecting the movement of objects. The SIS content comprehensively covers the skills required to explore the topics through an inquiry approach. Combined with the SHE content, which addresses the nature, purpose and use of Science, the overall breadth of the Year 2 content is comprehensive.

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 2, the expectations of the FNCC for Science, as addressed in the subject Environmental Studies, are considered **comprehensive** in relation to breadth of coverage. While the content that addresses concepts from the chemical and physical sciences lacks specificity and could be considered fundamental, the amount and detail provided for content relating to the biological and environmental sciences clearly supports the higher classification. The Finnish curriculum emphasises the development of science inquiry skills and, in addition to covering the full range of skills commonly attributed to the individual stages of scientific inquiry, such as observing, questioning, planning and conducting, analysing, evaluating and communicating, it includes a large range of related skills and competences, such as problem-solving, working collaboratively and critical and creative thinking.

AC – Depth

Depth: Fundamental

The expectations of the AC: S for Year 2 are **fundamental** with respect to the depth of coverage of knowledge as well as skills. Expressed in the form of broad statements, the content descriptions of the SU strand are written as propositions. The elaborations are written in the form of suggestions for possible learning activities and include some details about aspects of the targeted scientific concept that could encourage deeper coverage of the content. For example, ACSSU031 (ACARA, 2017h) states that “Different materials can be combined for a particular purpose”. Further details may be required by teachers and

students about whether the scientific concept to be explored is classification of materials according to properties, or how properties of materials affect their uses. A logical question would be about whether the idea of chemical reactions should be introduced at this stage. Consideration of the associated elaborations may lead a teacher to choose to “investigate the effects of mixing materials together”, and it would be important to establish what students would be expected to understand as a result of this investigation as the lack of detail could risk superficial coverage of the topic. The content descriptions of the SIS and SHE strands contain more relevant detail that would indicate a higher level of depth, but the overall expectations of the AC: S for Year 2 are rated as fundamental.

FNCC – Depth

Depth: Fundamental

For students at the end of Grade 2, the expectations of the FNCC: S as addressed in the subject Environmental Studies are considered **fundamental** in relation to depth of coverage. The information provided in the FNCC: ES regarding students’ development of science inquiry skills contains a considerable level of detail and creates the impression of high expectations with respect to the depth of scientific inquiry. It could even be considered ‘challenging’ at this year level. Two of six Content Areas are entirely dedicated to the students’ development of science inquiry skills, one of which specifically focuses on the different stages of conducting research and includes an additional focus on problem-solving skills and creative thinking by allowing students to “experiment and find different alternatives and solutions to everyday problems” (C4). Among other things, students are expected to collaboratively “conduct small experiments and research assignments in the surroundings and by growing plants” (C4) and to “use information and communication technology in acquiring information and storing and presenting observations” (O11) (FNBE, 2016).

The expectations regarding the students’ understanding of scientific concepts are not articulated with the same level of detail, which impedes an accurate assessment of the expected depth of coverage. In the field of chemical and physical sciences, the expected level of depth is considered to be limited. Topics from Chemistry and Physics are addressed in very broad terms, as, for example, in the objective “to guide the pupil to describe, compare, and classify [...] phenomena, technology, [and] materials” (O7). There is one instance, in the Content Area *Exploring and experimenting* (C4), of a concept being addressed more explicitly as “pupils observe motion and consider the reasons that cause changes in motion”. Topics related to the biological and environmental sciences are presented with more detail and indicate an expected level of depth that can be considered ‘fundamental’. For example, students “gain a general understanding of the parts and vital functions of the human body, the different stages of life, and the growth and development typical of his or her own age” (C2) or they “learn about the basic necessities of life in terms of food, water, air, warmth, and care. They become acquainted with food production and the origin of drinking water” (C5) (FNBE, 2016).

AC – Rigour

Rigour: Moderate

The expectations of the AC: S with respect to rigour are considered **moderate** at Year 2 level. The achievement standards and the elaborations in the SU and SHE strands offer evidence that students are expected to *observe, describe, identify* and *recognise* aspects of simple concepts of Science. The content descriptions and elaborations of the SIS strand list numerous opportunities for students to acquire knowledge of the prescribed scientific concepts through comparing, identifying, classifying, describing and explaining phenomena. There are some instances of content elaborations that involve deductive as well as inductive inference, such as “suggesting why different parts of everyday objects such as toys and clothes are made from different materials” (ACSSU031) (ACARA, 2017h), but there is no evidence of a level of abstract thinking or critical analysis and evaluation that would justify a higher rating.

FNCC – Rigour

Rigour: Moderate

The information presented in the Objectives of Instruction and Content Areas of the FNCC: ES (Grade 2) indicates a **moderate** degree of rigour. For students in Grades 1-2, Finland’s document does not state the expectations of student achievement as explicitly as it does for the later year levels. Hence, the judgement of rigour is based solely on the descriptions of Objectives of Instruction, Content Areas and Transversal Competences for those year levels.

At Grades 1-2, the FNCC: ES focuses on stimulating the students’ curiosity and interest in phenomena in their surroundings through problem-solving and research assignments based on play. Teachers are encouraged to provide learning environments that include aspects of *learning by doing*, experiential learning, and using drama and stories. Among other things, students are expected to “make observations and conduct experiments at school and in the surroundings” (O6), they “familiarise themselves with a diverse range of everyday technology” (O9) and “experiment, invent, build, and innovate together with other pupils” (O9) (FNBE, 2016). While some objectives do target higher-level skills with respect to cognitive demand, such as “justifying one’s views” (O14), the overall demand on students’ cognitive abilities is considered ‘moderate’.

Comparative Analysis

While the Science curricula of Australia and Finland are considered comparable with respect to breadth, depth and rigour at Year 2 level, there are considerable differences in the way the content of both curricula is presented as well as in the emphasis and focus of their objectives. The AC: S uses the type of knowledge and skills that students are required to learn as an organising principle. Knowledge and understanding of scientific concepts is subdivided into disciplinary fields and epistemic knowledge, which is separated from science-specific skills and further separated from the general capabilities and cross-curricular priorities. The three-dimensional nature of the AC is described in the introductory text and clearly conveys the message that the different dimensions and strands are intended to be taught in an integrated way.

In the FNCC, the descriptions of Objectives of Instruction, Content Areas and Transversal Competences are largely written as guidance for teachers regarding the type of learning experiences they ought to provide for students rather than as descriptions of what students are expected to learn. The wording of the objectives emphasises the role of the teacher as a facilitator of students' learning, seen in phrases such as "to guide/support/encourage pupils to..." or "to offer the pupil opportunities to..." (FNBE, 2016).

The FNCC promotes an integrated approach to the teaching of skills, epistemic knowledge and conceptual understanding. Despite its organisation in the form of Objectives of Instruction that are seemingly intended to target either attitudes or skills or knowledge and understanding, many objectives include aspects of several of those categories. In contrast to the AC, the Content Areas do not provide content in the form of descriptions of scientific concepts or topics, instead addressing broad 'themes' such as *Acting at home and at school (C2)*, *Exploring and Experimenting (C4)*, and *Practising a sustainable way of living (C6)*. These themes are intended to guide the teachers' selection of content, with some having a stronger focus either on conceptual knowledge or skills. Most address both types of content and interweave opportunities to practise transversal competences as well as develop desired attitudes.

At Grade 2, the FNCC: ES Objectives of Instruction in the category *Significance, values, and attitudes* are primarily concerned with providing a positive student experience and fostering positive attitudes towards the field of Environmental Science, such as satisfying the students' curiosity, helping students to experience their studies as meaningful and enjoyable, becoming aware of their own competence in the subject, and developing environmental awareness. Such goals are not expressed as explicitly in the AC: S.

The remaining two categories of the FNCC: ES Objectives of Instruction, i.e. *Research and working skills* and *Knowledge and understanding*, cannot be equated with the SIS and SU strands of the AC: S as they do not clearly separate conceptual knowledge from skills and, on occasion, address content in one category that could equally be placed in a different category. For example, Finland's O14 aims "to encourage the pupil to express himself or herself and to practise justifying his or her views" (FNBE, 2016) is listed under the category Knowledge and Understanding; the same content would more likely be considered part of the science inquiry skills in the AC: S.

Table 3.9 provides an overview of the topics and concepts of Science that are addressed in both curricula. The large number of topics of the FNCC: ES that relate to health and wellbeing and the small number relating to geography are not included in this comparison as they are described in detail elsewhere in this comparison of the two national curricula. Topics with a focus on sustainability have been included under Earth and space sciences.

Table 3. 9 AC-FNCC Comparison of Year 1-2 Science topics by discipline

AC: Science (Years F-2)	FNCC: Environmental Studies (Grades 1-2)
Students understand:	Students...
Biological sciences	
Living things <ul style="list-style-type: none"> - have basic needs, - live where their needs are met, - have a variety of external features, - grow, change, and have offspring similar to themselves 	recognise, describe, compare, and classify common species and their habitats in natural and built environments reflect on factors that support growth, development, health, and well-being and the basic necessities of life (food, water, air, warmth and care) understand parts and vital functions of the human body and the different stages of life
Chemical sciences	
Materials <ul style="list-style-type: none"> - have different properties and uses, - can be physically changed, - can be combined for particular purposes in a variety of ways 	describe, compare, and classify everyday phenomena, technology and materials
Earth and space sciences	
Daily and seasonal changes in our environment affect everyday life Observable changes occur in the sky and landscape Earth's resources are used in a variety of ways	observe and describe the characteristics of nature and phenomena of the environment, such as the weather, in all seasons become acquainted with food production and the origin of drinking water learn to reduce the amount of waste they generate, to recycle and to sort waste
Physical sciences	
The way objects move depends on a variety of factors, including their size and shape A push or a pull affects how an object moves or changes shape Light and sound are produced by a range of sources and can be sensed	observe motion and consider the reasons that cause changes in motion describe, compare and classify everyday phenomena and technology

While there is less detail around content related to the chemical and physical sciences, the table shows that the overall number of topics is comparable to that of the AC: S in Foundation to Year 2. This justifies the classification of comprehensive for both curricula.

Unlike the AC: S, the FNCC: ES does not explicitly label content relating to the nature of Science or Science as a Human Endeavour. However, the content described in the FNCC: ES conveys the same message as the content of the SHE strand in AC: S in Years 1 and 2; that is, "Science involves observing, asking questions about, and describing changes in, objects and events" (ACSHE034) and "People use science in their daily lives, including when caring for their environment and living things" (ACSHE035) (ACARA, 2017h).

Judging by the amount and detail of information provided, the FNCC: ES places significantly greater emphasis on the development of students' science inquiry skills and transversal competences than it does on conceptual understanding. Of the 12 Objectives of Instruction from the categories *Research and working skills* and *Knowledge and understanding*, eight are primarily or exclusively concerned with science inquiry skills, two address team working skills, two target critical and creative thinking and one focuses on ICT skills. In addition, two of the six FNCC: ES Content Areas are entirely dedicated to developing students' science inquiry skills covering all stages of scientific research from observing and questioning to planning, conducting, analysing, evaluating, and communicating. It is interesting to note that the FNCC: ES lists problem-solving, inventing, building, and innovating in close conjunction with those traditional inquiry skills, a connection that is not as visible in the AC: S. It is also worth noting that the FNCC: ES includes the important higher-order skill of "justifying one's views" (O14), which combines aspects from the categories of Evaluating and Communicating. This may be considered more demanding than what is expected of Year 2 students in the AC: S, which is to "Compare observations with those of others".

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: Science (AC: S)

Finnish National Core Curriculum: Environmental Studies (FNCC: ES)

Expectations: Knowledge and Skills

At Year 6 level, the AC: S expects students to compare and classify different types of observable changes to materials, analyse requirements for the transfer of electricity, describe how energy can be transformed from one form to another when generating electricity, explain how natural events cause rapid change to Earth's surface, describe and predict the effect of environmental changes on individual living things, and explain how scientific knowledge helps to solve problems, inform decisions and identify historical and cultural contributions.

With respect to Science inquiry skills, students are expected to follow procedures, develop investigable questions, design investigations into simple cause-and-effect relationships, identify variables to be changed and measured and describe potential safety risks when planning methods. They are expected to collect, organise and interpret their data, identifying where improvements to their methods or research could improve the data, to describe and analyse relationships in data using appropriate representations, and to construct multimodal texts to communicate ideas, methods and findings.

Finnish students in Grades 3 to 6 learn about Science through the subject of FNCC: ES, which integrates content from the fields of Biology, Geography, Physics, Chemistry and Health Education. This is described in more detail in the comparison of the AC's Year 2 Science and Finland's Grade 2 Environmental Studies. In addition to the seven Transversal Competences and six Content Areas, which remain constant in number for all year levels, the FNCC: ES at Grade 6 specifies 18 Objectives of Instruction that address values and attitudes, science inquiry skills, and knowledge and understanding.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 6, the expectations of the AC: S are **comprehensive** in relation to breadth of coverage. The content descriptions address four topics in the Science Understanding strand, relating to one fundamental concept from each of the four disciplines of Biology, Chemistry, Earth and Space Science, and Physics, seven Science Inquiry Skills and two concepts relating to Science as a Human Endeavour. Each content description in the SU and SHE strand is supported by several elaborations that provide additional detail. The topics in the SU strand are defined broadly enough to allow for sustained and rich learning opportunities, and the SIS content comprehensively addresses the skills required to explore the topics through an inquiry approach. Combined with the SHE content, which addresses the nature, purpose and use of Science, the overall breadth of the Year 6 content is considered comprehensive.

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 6, the expectations of the FNCC: ES are considered **comprehensive** in relation to breadth of coverage. Students are given learning opportunities covering numerous topics and scientific concepts from all four major disciplines of science (see Table 3.9). The FNCC: ES also prescribes numerous hands-on activities that allow students “to practise the different stages of conducting research” (C4). The complete suite of individual science inquiry skills required for these activities is addressed explicitly in several Objectives of Instruction, as in O5, “to guide the pupil to plan and carry out small-scale research projects and to make observations and take measurements in versatile learning environments using different senses and research and measuring equipment” (FNBE, 2016).

AC – Depth

Depth: Limited

The expectations of the AC: S for Year 6 are **limited** with respect to the depth of coverage of knowledge and skills encountered in the curriculum. This rating is based, in the main, on the lack of specificity about which scientific concepts are the intended focus of teaching and learning and the depth to which they are expected to be explored.

FNCC – Depth

Depth: Challenging

For Grade 6, the overall expectations of the FNCC: ES are considered **challenging** in relation to depth of coverage. The scientific concepts that teachers are required to cover in the FNCC: ES indicate high expectations with respect to the depth of understanding. For example, the Content Area *Structures, principles, and cycles of nature* (C5) states that “Combustion, photosynthesis, and the hydrological cycle form the basis for perceiving the changes in substances and the law of conservation of mass” (FNBE, 2016). The chemical and physical processes addressed here can be considered challenging for Grade 6 level. For students to gain a deep enough understanding of these processes and be able to link them to the law of conservation of mass in a meaningful way would require an in-depth investigation of this topic. The FNCC: ES expresses similarly high expectations with respect to depth for science inquiry skills, as, for example, evidenced in the objective “to guide the pupil in obtaining reliable information, expressing and justifying different views, and interpreting and critically evaluating information sources and viewpoints” (O14) (FNBE, 2016).

AC – Rigour

Rigour: Moderate

The terminology and expectations of the AC: S for Year 6 indicate a **moderate** degree of rigour. The elaborations of all three strands of the AC: S provide numerous examples that require students to compare, classify, describe and explain aspects of phenomena. However, relatively few examples provide evidence for engaging students in abstract thinking and reasoning, or a level of individual planning, critical analysis and evaluation of investigations that would justify a higher rating for this year level.

FNCC – Rigour

Rigour: Moderate

The information presented in the FNCC: ES for Grade 6 indicates a **moderate** degree of rigour with respect to knowledge and skills. Most expectations of student achievement, as expressed in the final assessment criteria, require students to describe and explain aspects of scientific concepts and phenomena, rather than asking them to apply their knowledge and skills using higher-order thinking skills. With regard to science inquiry skills, the expectations remain at a moderate level of rigour at this Grade level, as may be exemplified by the final assessment criterion for O6: “The pupil practises identifying causal relationships with guidance and is able to draw simple conclusions on the results” (FNBE, 2016).

Comparative Analysis

While the breadth of coverage has been classified as ‘comprehensive’ both for the Finnish and Australian curricula, the FNCC: ES exposes students to an even broader and more challenging selection of topics and concepts at Year 3-6 levels. For example, in the biological sciences, the FNCC: ES has an additional focus on human biology and addresses concepts such as photosynthesis, food chains, and the reproduction of animals and plants. These are introduced in the AC: S at the lower secondary stage of schooling. There are

similar examples from other disciplines, such as chemical reactions and the law of conservation of mass (AC: S, Year 9), the hydrological cycle (AC: S, Year 7), and climate change (AC: S, Year 10). A comprehensive overview of the topics covered in both curricula is provided in Table 3.10.

In contrast to the AC: S, the FNCC: ES does not explicitly label content relating to science as a human endeavour; it is incorporated into the themes for the Content Areas and the Objectives of Instructing. Further detail is provided in the comparison at Year 10 level.

Table 3. 10 AC-FNCC Comparison of Year 3-6 Science topics by discipline

AC: Science (Years 3-6)	FNCC: Environmental Studies (Grades 3-6)
Students understand:	Students...
Biological sciences	
<p>Living things</p> <ul style="list-style-type: none"> - can be grouped on the basis of observable features and can be distinguished from non-living things, - have life cycles, - depend on each other and the environment to survive, - have adaptations that help them survive in their environment, - are affected by physical conditions of their environment 	<p>explore nature, identify organisms and habitats, and think ecologically</p> <p>explore the interactive relationships between organisms, habitats, and human activities</p> <p>learn about photosynthesis, food chains, reproduction of animals and plants, the production and routes of food as well as the commercial use of forests</p> <p>compile a herbarium and study the growth of plants</p> <p>understand the structure, vital functions, and development of humans</p>
Chemical sciences	
<p>Materials have different properties that influence their use.</p> <p>Solids, liquids and gases have different properties and behave in different ways.</p> <p>Changes between states can be caused by adding or removing heat.</p> <p>Changes to materials can be reversible or irreversible</p>	<p>explore, describe, and explain chemical phenomena and the characteristics and changes of substances</p> <p>understand the law of conservation of mass</p> <p>study, explore, learn about states of matter, properties of substances, and changes in substances, including combustion</p>
Earth and space sciences	
<p>Earth's rotation on its axis causes regular changes, including night and day</p> <p>Earth's surface changes over time as a result of</p> <ul style="list-style-type: none"> - natural processes and human activity - sudden geological changes and extreme weather events <p>The Earth is part of a system of planets orbiting around a star (the sun)</p>	<p>study the weather, the soil, the bedrock, and the hydrological cycle</p> <p>learn about the near space, seasons, variation of day and night, and the structure of the Earth</p> <p>learn about fostering biodiversity, climate change and its mitigation, sustainable use of natural resources</p> <p>practise environmentally responsible actions in their surroundings</p>
Physical sciences	
<p>Forces can be exerted by one object on another through direct contact or from a distance</p> <p>Light from a source forms shadows and can be absorbed, reflected and refracted</p> <p>Heat can be produced in many ways and can move from one object to another</p> <p>Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources</p>	<p>explore, describe, and explain physical phenomena in daily life, nature, and technology</p> <p>examine changes in the movement of objects and familiarise themselves with the concept of force</p> <p>study phenomena related to sound and light</p> <p>are familiarised with the law of conservation of energy, thermal energy through measuring temperatures and learn about the conversion of energy</p>

Finland's curriculum puts a strong focus on authentic learning environments and the active engagement of students in activities that go beyond the school setting. Examples are found

in objective O2, which asks teachers “to guide the pupil to act and become involved in his or her surroundings and community in order to promote sustainable development” and in the Content Area *Building a sustainable future* (C6): “A collaborative project is carried out where the pupils practise participation and involvement at the local or the global level”. Teachers are required to provide versatile learning environments that “include a versatile range of local natural and built environments, various communities and interaction situations, ICT environments as well as local opportunities, including cooperation with nature schools, museums, companies, non-governmental organisations, and nature and science centres” (FNBE, 2016).

In the FNCC: ES, much of the content relating both to knowledge and skills is linked to either personal health and safety or to the promotion of a sustainable way of living, which conveys a strong sense of purpose for the study of Science and could be considered conducive to making the learning area relevant to students' own lives.

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: Science (AC: S)

Finnish National Core Curriculum: Biology (FNCC: B)

Geography (FNCC: G)

Chemistry (FNCC: Ch)

Physics (FNCC: P)

Expectations: Knowledge and Skills

Australian students completing Year 10 in the AC: S are expected to have gained an understanding of the structure and function of cells and multi-cellular organisms, the interdependencies of species in ecosystems, and the role of genes and DNA in the processes that underpin heredity and evolution. They should understand the structure of the atom and how properties of substances as well as physical and chemical changes can be explained through the particulate nature of matter. They are expected to describe and predict the motion of objects as a consequence of forces acting upon them and explain energy conservation and represent energy transfer and transformation within systems.

Students are expected to have gained an understanding of different types of rocks and explain the theory of plate tectonics, describe and analyse interactions and cycles within and between Earth's spheres, and evaluate the evidence for scientific theories that explain the origin of the universe and the diversity of life on Earth. They are expected to analyse how the models and theories they use have developed over time and discuss the factors that prompted their review. Students are also expected to develop questions and hypotheses and independently design and conduct scientific investigation, explain how they have considered reliability, safety, fairness and ethical actions in their methods, identify where digital technologies can be used to enhance the quality of data, select evidence and develop and justify conclusions, identify alternative explanations for findings and explain any sources of uncertainty, evaluate the validity and reliability of claims made in secondary sources with reference to currently held scientific views, construct evidence-based arguments and select

appropriate representations and text types to communicate science ideas for specific purposes.

In the FNCC Grades 7-9, the learning area of Science is primarily addressed in the three separate subjects of Biology, Chemistry and Physics. Some topics of Earth and Space Science are also addressed in the subject Geography, specifically those relating to issues of sustainability, such as resource management and climate change. All subjects have a strong focus on sustainability and are presented in a way that “conveys an image of the significance of [Science] in building a sustainable future: [Science] is needed in developing new technological solutions and securing the well-being of humans and the environment” (FNBE, 2016). Students are expected to gain an understanding of biological taxonomy, the regulatory systems and development of the human body, the structure and functions of ecosystems, and the basic principles of heredity and evolution. They study the particle nature of matter, the internal structure of the atom, and the principles underlying chemical reactions. Students are also expected to understand the concept of energy and its various forms and transformations in a qualitative way and to describe objects in motion and electric circuits quantitatively. Students are expected to engage in collaborative as well as individual investigations of scientific phenomena that encompass all stages of the research process.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 10, the expectations of the AC: S are regarded as **comprehensive** with respect to breadth of coverage. The content descriptions address eight topics in the Science Understanding strand, relating to two fundamental concepts from each of the four disciplines of Biology, Chemistry, Earth and Space Science, and Physics, eight Science Inquiry Skills and four concepts relating to Science as a Human Endeavour. Each of the content descriptions in the SU and SHE strand is supported by several elaborations that provide additional detail. Although sometimes loosely connected, the two topics within each of the disciplinary fields of the SU strand clearly address different scientific concepts and are defined broadly enough to be counted as separate topics and allow for sustained and rich learning opportunities. The SIS content comprehensively addresses the skills required to explore the topics through an inquiry approach. Combined with the SHE content, which addresses the nature, purpose and use of Science, the overall breadth of the Year 10 content is considered comprehensive.

FNCC – Breadth

Breadth: Comprehensive

For students at the end of Grade 9, the expectations of the FNCC for Science as addressed in the subjects of Biology, Chemistry, Physics and Geography are considered **comprehensive** in relation to breadth of coverage. Each of the subjects specifies between 13 and 15 Objectives of Instruction and six Content Areas that expose students to a large variety of scientific concepts, including many that deal with the nature of Science, its technological applications and mutual impact on society. Students are expected to engage in collaborative activities as well as those that encompass all stages of the research process.

AC – Depth

Depth: Challenging

The expectations of the AC: S (Year 10) are **challenging** with respect to the depth of coverage of knowledge and skills encountered in the curriculum. Although the issue of the non-mandatory nature of the elaborations, which are the primary source of information for gauging the expected depth and rigour of the curriculum, also applies in Year 10, the types of concepts addressed in these elaborations and the wealth of scientific terminology used in the wording of these suggested learning activities clearly demonstrate an expected in-depth coverage of the topics that goes beyond fundamental.

FNCC – Depth

Depth: Fundamental

For students at the end of Grade 9, the expectations of the FNCC: S as addressed in the subjects of Biology, Chemistry, Physics and Geography are considered **fundamental** with respect to depth of coverage. Some of the information provided in the Content Areas of the FNCC lacks the detail and specificity required to adequately gauge the level of depth to which the scientific concepts are expected to be explored. An example in the FNCC: Biology illustrates this, where the Objective of Instruction O4 asks teachers “to guide the pupil to understand the basic principles of heredity and evolution”. In the Content Area titled *What is life?* (C4), the information given in relation to the same topic is “[The pupils] familiarise themselves with the basics of heredity and evolution”. The FNCC does not provide any further details that would indicate which specific scientific concepts and processes are considered to be the *basic principles* and how deep an understanding a student is expected to gain with respect to this topic. The final assessment criterion that addresses the theory of evolution states “The pupil is able to describe how life and biodiversity have developed on Earth as an outcome of evolution”, which does not allow for a more detailed assessment of the expected depth of coverage. It is a similar situation for all objectives that target students’ conceptual understanding of scientific phenomena, implying that the FNCC leaves the judgment of depth of coverage to the discretion of the teacher (FNBE, 2016).

Many of the themes selected for the Content Areas would suggest that a more challenging depth of coverage is implied, particularly those areas that ask for the inclusion of current scientific topics, applications, and modern-day research, as well as those in FNCC: Physics that require a quantitative discussion of certain scientific concepts. Nevertheless, the overall

classification based on the information available in the FNCC document is considered 'fundamental'.

AC – Rigour

Rigour: Moderate

The expectations of the AC: S at the end of Year 10, as gauged by the content elaborations and achievement standards, indicate a **moderate** degree of rigour. The elaborations of all three strands of the AC: S provide numerous examples that place considerable demand on students' ability to engage in abstract thinking and reasoning. Students are expected to research, plan investigations, analyse data and apply critical, creative and collaborative skills to solve problems and apply solutions to real-world issues. The lack of evidence for quantitative analysis and mathematical application of scientific concepts suggests a moderate level of rigour.

FNCC – Rigour

Rigour: Challenging

The level of rigour encountered by Grade 9 students in the FNCC subjects of Biology, Chemistry, Physics and Geography is considered **challenging**. While many of the expectations expressed in the FNCC's final assessment criteria focus on the students' ability to *describe* and *explain* scientific phenomena, which is often considered an indicator of lower level cognitive demand, a significant number of criteria deal with the students' ability to apply their knowledge and skills in a variety of situations that often include a real-life component. Some of those expectations can clearly be considered challenging, as, for example, the final assessment criterion for FNCC: Physics, O8: "The pupil is able to work in cooperation in forming ideas for a technological solution as well as planning, developing, and applying it" and that of FNCC: Biology, O11: "The pupil participates in a nature conservation project in his or her surroundings, including its implementation and reporting on its results" (FNBE, 2016). Combined with the explicit expectation of the FNCC: Physics that some concepts are to be explored in a quantitative manner, the overall level of rigour in the science-related subjects of the FNCC justifies the high rating.

Comparative Analysis

The selection of content in both curricula is very similar in terms of scientific concepts. Both curricula focus on taxonomy, organ systems, heredity and evolution, and on ecosystems in the biological sciences; the particle nature of matter, the internal structure of the atom, and the principles underlying chemical reactions in the chemical sciences; and the concept of energy and its various forms and transformations, as well as the description of objects' motion in the physical sciences.

Some topics covered in the AC: S sub-strand of Earth and Space Sciences are addressed in FNCC: P, such as the structure and dimension of the universe, and others in FNCC: G, such as resource management and the human impact on global systems. The only major concepts of the AC: S that do not have an equivalent in the FNCC are those related to Geology, namely the discussion of different types of minerals and the theory of plate

tectonics. Although no major scientific concepts could be identified in the FNCC that are not also covered to some extent in the AC, the FNCC: B has a more explicit focus on human biology, whereas the AC: S focuses more on general and cellular biology.

Even though Science as a Human Endeavour is included as a separate strand in the AC: S, it could be argued that the FNCC places even more emphasis on this type of content. Evidence for this is found in the selection of themes for the Content Areas of the FNCC. For example, both FNCC: P and FNCC: Ch dedicate three of their six Content Areas to topics that focus on the application and importance of Science in daily life and on its role in and impact on society. For FNCC: P, the themes are *Physics in the pupil's daily life and living environment (C2)*, *Physics in the society (C3)* and *Physics shaping the worldview (C4)*. The wording is identical for FNCC: Ch. The contents specified in these areas include a strong focus on the discussion of current technologies and their benefits and implications for society. An example is seen in FNCC: Ch, C4, with the expectation that "The contents also include familiarisation with chemistry-related news, current topics, applications and modern-day research". A strong focus on current technologies and issues is expressed in FNCC: B, with the expectation in C4 that "They examine the opportunities and challenges of biotechnology" and C6: "The pupils reflect on the ecological, social, economic, and ethical principles of using natural resources, as well as sustainable food production and animal welfare" (FNBE, 2016).

The FNCC is purposeful in its attempt to make the learning area of Science relevant to students' lives. The abovementioned focus on current research and contemporary issues in Science is an example. Further evidence is given by the FNCC's explicit directives for teachers to consider students' interests in their selection of content and to provide students with learning opportunities that allow them to recognise the importance of Science for their potential future career paths. In C1, for instance, "Suitable contents for closed-ended and open-ended research are elected from different content areas as well from pupils' topics of interest" and in C3 "The pupils familiarise themselves with different educational paths and professions in which competence in physics [or chemistry] is required" (FNBE, 2016).

Both curricula place a similarly strong emphasis on the development of science inquiry skills and expect students to collaboratively, as well as individually, plan and conduct different types of scientific investigations, including field work and laboratory experimentation. The relevant stages of the research process are emphasised in both curricula and their increased focus on data analysis and critical evaluation of sources and methods at the secondary level is equally strong.

While both curricula are considered to have similar expectations with respect to depth and rigour, there are also some differences, as reflected in the different classifications for those two categories. The 'fundamental' level of depth in the FNCC is primarily attributed to the fact that the curriculum document does not provide sufficient detail regarding the specific concepts students are expected to explore to justify classifying its expectations as 'challenging'. The FNCC provides clear guidance to teachers regarding the purpose of instruction, the pedagogical approach to be taken, and the contexts and themes within which the scientific concepts are to be addressed but appears to rely on teachers to determine depth of coverage.

With respect to rigour, the expectations have been rated slightly higher in the FNCC than in the AC. This determination rests primarily on the fact that the FNCC seems to place greater emphasis on the students' practical application of scientific knowledge and skills in diverse situations that are often described as having a real-life focus and containing perspectives from multiple disciplines. The fact that, in comparison to the AC: S, the FNCC: Physics explicitly requires students to quantitatively explore the movement of objects under the influence of forces and the concepts underpinning the function of electrical circuits, has contributed its higher classification for rigour.

Additional Observations

Contrary to the AC: S, the FNCC provides clear guidance regarding the pedagogical approach that is to be followed by teachers. In all science-related subjects, the FNCC strongly advocates for an inquiry-based approach to teaching.

The FNCC also explicitly requires teachers to design multidisciplinary learning modules that allow students to apply their scientific knowledge and skills in a variety of real-life scenarios that also incorporate perspectives from economics and the social sciences. An example is drawn from FNCC: Physics/Chemistry, where O15 asks teachers "to guide the pupil to apply his or her knowledge and skills in Physics in multidisciplinary learning modules and to provide opportunities for getting acquainted with applying Physics in different situations, such as in nature, industries, organisations, or scientific communities" (FNBE, 2016).

d) Humanities and Social Sciences

Comparative Curricula

Australian Curriculum: Humanities and Social Sciences	Version 8.3, 2016
Australian Curriculum: Civics and Citizenship	Version 8.3, 2016
Australian Curriculum: Economics and Business	Version 8.3, 2016
Australian Curriculum: Geography	Version 8.3, 2016
Australian Curriculum: History	Version 8.3, 2016
Finnish National Core Curriculum: Environmental Studies	Version 2016:5, 2014
Finnish National Core Curriculum: Geography	Version 2016:5, 2014
Finnish National Core Curriculum: History	Version 2016:5, 2014
Finnish National Core Curriculum: Social Studies	Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2
Finnish National Core Curriculum: Grade 2

Learning Area/Subject

Australian Curriculum: Humanities and Social Sciences (AC: HASS)
Finnish National Core Curriculum: Environmental Studies (FNCC: ES)

Expectations: Knowledge and Skills

The expectations of the AC: HASS in Year 2 involve the topic *Our past and present connections to people and places*. This builds upon the Foundation topic *My personal world* and the Year 1 topic *How my world is different from the past and can change in the future*. The Year 2 content is organised into two strands: *inquiry and skills*, and *knowledge and understanding*. The inquiry and skills strand develops students' capacity to *question, research, analyse, evaluate and reflect, and communicate*. The knowledge and understanding strand is divided into two sub-strands: History and Geography. These sub-strands are interrelated and allow Year 2 students to begin to explore near and distant places with which they are familiar, and to investigate the connections between past and present, and between people and places. The three guiding inquiry questions are:

- What does my place tell me about the past and present?
- How are people connected to their place and other places, past or present?
- How has technology affected daily life over time and the connections between people in different places?

The concepts and skills of AC: HASS allow learners to build upon experiences from the curriculum in Foundation and Year 1 as they continue to explore their personal past and present in a way that aligns with Paul Hanna's "expanding communities" model for social science education (Stallones, 2003). The depth and detail to which learners should explore each content statement are made explicit, with further possible indicators of depth provided through multiple elaborations which operate as suggestions for classroom implementation. The inquiry skills in the content descriptions in AC: HASS focus mainly upon simple observations, interpretations and communication.

No equivalent subject area is found in the FNCC for Grade 2. Geographical skills and knowledge are included in the FNCC: ES and the following observations are based solely on these areas within this subject. In the FNCC: ES, the objectives of instruction are organised into three strands: *significance, values and attitudes*; *research and working skills*; and *knowledge and understanding*. FNCC: ES is made up of six key content areas. Two of these content areas contain geographical concepts and understandings:

- Observing the surroundings and their changes
- Practising a sustainable way of living.

Within these key content areas, the FNCC: ES identifies student observation of environmental phenomena such as weather and seasons, student understanding of the concept of a map, and student participation in activities associated with sustainability. The local education provider determines the timing, duration and scope of this learning. The FNCC: ES recommends that examples and learning experiences be drawn from the immediate environment, that is, the school or local region. Each of Finland's seven Transversal Competences is referenced at least once in relation to the geographical elements, with most emphasis being upon T1 (Thinking and learning to learn) followed by T4 (Multiliteracy). The aim of the Geography strand within FNCC: ES is to "explore the pupil's local environment and to understand different areas of the globe, the phenomena that occur in them, and the lives of the people living in them" (FNBE, 2016, p. 177). Depth and detail are enhanced through the transversal competences which are linked to all content areas of the FNCC: ES across each year level. For example, in T1 (Thinking and learning to learn) there is an expectation that "age-appropriate problem-solving and research assignments help stimulate the pupils' curiosity about and interest in phenomena of the surrounding world and improve their ability to analyse, name and describe elements in their surroundings" (FNBE, 2016, p. 136). The programming, structures and pedagogical decisions and practices through which these are implemented are matters for individual education providers, who must consider "the pupil's needs, local special features and the results of self-evaluation and development efforts" (FNBE, 2016, p. 11).

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: Humanities and Social Sciences (AC: HASS)

Finnish National Core Curriculum: History (FNCC: H)

Social Studies (FNCC: SS)

Environmental Studies (FNCC: ES)

Expectations: Knowledge and Skills

The expectations of the AC: HASS in Year 6 involve the topic *Australia in the past and present and its connection with a diverse world*. This builds upon the Year 3 topic *Diverse communities and places and the contribution people can make*, the Year 4 topic *How people, places and environments interact, past and present* and the Year 5 topic *Australian communities – their past, present and possible futures*. The Year 6 content is organised into two strands: inquiry and skills, knowledge and understanding. The inquiry and skills strand

develops students' capacity to *question, research, analyse, evaluate and reflect*, and *communicate*. The knowledge and understanding strand is divided into four sub-strands: History, Geography, Civics and Citizenship, and Economics and Business. These sub-strands are interrelated and allow Year 6 students to explore events, developments and issues that shape Australia as a democratic nation, and to understand how they are interconnected with diverse people and places across the globe. The three guiding inquiry questions are:

- How have key figures, events and values shaped Australian society, its system of government and citizenship?
- How have experiences of democracy and citizenship differed between groups over time and place, including those from and in Asia?
- How has Australia developed as a society with global connections, and what is my role as a global citizen?

In comparison, the FNCC: ES is a four-year continuous course, commencing in Grade 3, that builds upon the learning expectations of Grade 1 and Grade 2. The expectations of FNCC: ES across Grade 3 to Grade 6 contain objectives of instruction that are composed of geographical skills and knowledge and the following comparison again considers these features as part of its judgement. The objectives of instruction are organised into three strands: *significance, values and attitudes; research and working skills; and knowledge and understanding*. The FNCC: ES is made up of six key content areas, of which two contain geographical concepts and understandings:

- Observing the surroundings and their changes
- Practising a sustainable way of living.

Similarly, the FNCC: H is a three-year continuous course, commencing in Grade 4. The expectations of FNCC: H across Grade 4 to Grade 6 contain objectives of instruction that are organised into four strands: *significance, values and attitudes; acquiring information about the past; understanding historical phenomena; and applying historical knowledge*. There are five key content areas and these can be sequenced either chronologically or thematically as determined by the local education provider:

- Prehistoric era and the birth of civilisation
- Ancient times and the heritage of the classical period
- Middle Ages
- The revolution of the modern times
- Finland as part of Sweden.

The FNCC: SS is a three-year continuous course, commencing in Grade 4. The expectations of FNCC: SS across Grade 4 to Grade 6 contain objectives of instruction that are organised into three strands: *significance, values and attitudes; adopting knowledge and skills needed in the society and societal understanding; using and applying societal power*.

There are four key content areas:

- Daily life and personal life management
- Democratic society
- Active citizenship and involvement
- Economic activity.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 6, the expectations of the AC: HASS are **comprehensive** in relation to breadth of coverage. The concepts and skills of AC: HASS allow Year 6 learners to build upon experiences from the curriculum in Year 3, Year 4 and Year 5 as they continue to explore their personal past and present. This aligns with Hanna’s “expanding communities” model for social science education (Stallones, 2003). In Year 5 and Year 6, the AC: HASS expands to include four sub-strands (History, Geography, Civics and Citizenship, Economics and Business) and presents concepts and additional inquiry questions within the overview statements for each sub-strand.

Each knowledge and understanding content description contains multiple elaborations. The inquiry and skill categories apply across all four sub-strands and each has one or more elements, with one or more elaborations.

Table 3. 11 *Number of content descriptions in AC: HASS, Year 6*

Year 6	Humanities and Social Sciences			
General capabilities	7			
Cross-curriculum priorities	3			
Inquiry questions	3			
Content description: inquiry and skills	12			
Elaborations	54			
Year 6	History	Geography	Civics and Citizenship	Economics and Business
Key concepts	6	5	3	4
Inquiry questions	4	3	3	3
Content description: knowledge and understanding	4	4	6	3
Elaborations	17	13	19	10

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 6, the expectations of the FNCC: ES, the FNCC: H and the FNCC: SS are regarded as **comprehensive** in relation to breadth of coverage.

The content identified for inclusion at some point during the four years of the FNCC: ES identifies the use of maps and other geomeia to build a world view and regional frame of reference, an exploration of natural and built environments, and student participation in a collaborative project based on a local or global issue. The aim of the geography strand within FNCC: ES, as in Grade 2, is to “explore the pupil’s local environment and to understand different areas of the globe, the phenomena that occur in them, and the lives of the people living in them” (FNBE, 2016, p. 299). A multidisciplinary approach is recommended to be adopted with the use of authentic situations and environments. Six of the seven transversal competences are referenced at least once, with most emphasis upon T1 (Thinking and learning to learn) followed by T5 (ICT competence).

The content identified for inclusion in the three years of the FNCC: H offers a broad overview of Western European civilisation from pre-historic to the end of the 18th century, with a focus on developments in the Nordic countries and Finland in particular. The aim of the FNCC: H is to “develop the pupils’ knowledge of history and cultures and to encourage them to adopt the principles of responsible citizenship” (FNBE, 2016, p. 317). The content addresses the history of the students’ “family, region and local area, when appropriate” (FNBE, 2016, p. 319). Each of the seven transversal competences is referenced at least once, with most emphasis upon T2 (Cultural competence, interaction and self-expression), followed by T4 (Multiliteracy) and T7 (Participation, involvement and building a sustainable future).

The content for inclusion in the three years of the FNCC: SS familiarises students with the knowledge and skills to function within their community. The aim of FNCC: SS is to “support the pupils’ growth into active, responsible and enterprising citizens” (FNBE, 2016, p. 321). Each of the transversal competences is referenced at least once, with most emphasis upon T4 (Multiliteracy), followed by T2 (Cultural competence, interaction and self-expression), T3 (Taking care of oneself and managing daily life) and T7 (Participation and involvement and building a sustainable future).

Table 3. 12 *Number of content descriptions in FNCC: H, FNCC: SS, FNCC:ES, Grade 3-6*

Grade 3-6	History	Social Studies	Environmental Studies (Geography elements)
Objectives of instruction	11	9	11
Content areas	5	4	3
Transversal competences	7	7	7

AC – Depth

Depth: Fundamental

The expectations of the AC: HASS for Year 6 are evaluated as **fundamental**, based on the details of the knowledge and topics demanded in the written curriculum. In Year 6, the content descriptions of the AC: HASS expand to 17 areas of knowledge and understanding associated with the topic *Australia in the past and present and its connection with a diverse world*. The depth to which learners should explore each content statement is indicated within its wording, with further possible indicators of depth provided through multiple elaborations which operate as suggestions for classroom implementation. The content descriptions and associated inquiry questions primarily focus upon the collection and recall of information and presentation of narratives and explanations.

FNCC – Depth

Depth: Challenging

The expectations of the FNCC: ES, FNCC: H and FNCC: SS for Grade 6 are evaluated as **challenging**, based on the details of the knowledge and topics documented in the written curriculum.

The FNCC: ES is an integrated subject comprising Biology, Geography, Physics, Chemistry and Health Education within the perspective of sustainable development. The objectives of instruction for the four-year course provide guidance to teachers in relation to the detail required in the subject-specific student attitudes, skills, knowledge and understanding. The intention is for teachers to *spark and maintain, help, guide, encourage and support* students to *experience, formulate, understand, plan and carry out and practise* skills, information and ideas about their environment. This pedagogical advice demonstrates a focus on achieving high levels of student engagement. The content areas are presented as short individual statements such as, “maps and geomeia are used diversely in building the pupils’ worldview and its regional frame of reference” or “pupils study the weather, the soil, and the bedrock” (FNBE, 2016, p. 301). There is little specificity or elaboration.

In the FNCC: H, the objectives of instruction for the three-year course provide guidance to teachers in relation to the subject-specific attitudes, understanding and knowledge. The intention is for teachers to *guide, help, teach and instruct* students to *recognise, notice, perceive, understand, identify and explain*. The content areas are presented as short individual statements such as “pupils learn about the lives of small human populations, the hunter-gatherer culture, the revolution of farming culture, and the birth of civilisation”, or “pupils are familiarised with changes that took place in Science, arts and people’s beliefs” or “pupils learn about the developments in Finland in the 17th and 18th century” (FNBE, 2016, p. 319). The curriculum offers relatively little specificity or elaboration.

In the FNCC: SS, the objectives of instruction across the three-year course provide guidance to teachers in relation to the subject-specific attitudes, understanding and knowledge. Teachers are to *guide, help, teach and instruct* students to *become interested, practise, become aware, perceive, understand, reflect and participate*. The content areas are presented as short individual statements such as “pupils learn about different cultures and

minority groups in Finland”, or “pupils explore economic activity and its significance” but there is little detail or elaboration (FNBE, 2016, p. 323).

Additional expectations of depth and detail are provided through the transversal competences which are linked to all content areas of the FNCC: ES, FNCC: H and FNCC: SS. This linkage is indicated in the following table.

Table 3. 13 Number of references to transversal competences in FNCC: H, FNCC: SS, FNCC: ES, Grade 3-6

Transversal competence	FNCC: ES Grades 3-6 (Geography elements)	FNCC: H Grades 4-6	FNCC: SS Grades 4-6
T1: Thinking and learning to learn	7	8	1
T2: Cultural competence, interaction and self-expression	2	11	4
T3: Talking care of oneself and managing daily life	1	6	4
T4: Multiliteracy	2	10	6
T5: ICT competence	5	5	2
T6: Working life competence and entrepreneurship	0	6	2
T7: Participation, involvement and building a sustainable future	3	9	4

The programming, structures and pedagogical decisions through which these transversal competences are implemented are matters for individual education providers and it is expected that these decisions will consider “the pupil’s needs, local special features and the results of self-evaluation and development efforts” (FNBE, 2016, p. 11).

AC – Rigour

Rigour: Moderate

The cognitive demand placed on Year 6 students in the AC: HASS indicates a **moderate** degree of rigour. The directive terms and expectations of students seen in the content descriptions are predominantly associated with recall, recount, explanation and application. This corresponds to the cognitive development of students at Year 6. The Year 6 achievement standards for AC: HASS, written for students in this age group, are dominated by the following terms: *identify, explain, describe, compare, locate* – with some use of *analyse, interpret, reflect* and *take action*.

FNCC – Rigour

Rigour: Challenging

The cognitive demand placed on Grade 6 students in the FNCC: ES, FNCC: H and FNCC: SS indicates a **challenging** degree of rigour. Each of the objectives of instruction is linked to its own detailed statement regarding student achievement at the level of ‘good’ (which is

reported as numerical Grade 8). These statements describe what a student is 'able' to do or know at the end of the course, with many statements containing multiple parts and indicators. Each statement is linked to its own assessment target. In the FNCC: ES, there are 11 separate statements relating to geographical skills, knowledge and understanding, and 11 associated assessment targets. The FNCC: H contains 11 separate statements and associated assessment targets. In FNCC: SS there are nine separate statements and associated assessment targets.

While the subject-specific assessment statements are dominated by terms such as *describe*, *identify* and *use*, there is regular use of *explain*, *apply*, *justify*, *formulate* and *interpret*, *compare* and *act*. These subject-specific assessment statements also operate in conjunction with the mandated objectives of the transversal competences in Grade 3 to Grade 6. For example, in T1 (Thinking and learning to learn) there is an expectation that "thinking skills are practised by using problem-solving and reasoning tasks and working approaches that utilise and promote curiosity, imagination, inventiveness, and learning by doing" (FNBE, 2016, p. 205). In T4 (Multiliteracy) teachers are expected to have students *analyse*, *compare* and *evaluate* as they develop "critical literacy in cultural contexts that are meaningful to the pupils" (FNBE, 2016, p. 207).

All programming, structures and pedagogical decisions relating to implementation are mandated as matters for individual education providers, and it is expected that these decisions will also consider "the pupil's needs, local special features and the results of self-evaluation and development efforts" (FNBE, 2016, p. 11)

Comparative Analysis

The AC: HASS in Year 6, and the FNCC: ES, FNCC: H and FNCC: SS for Grade 6 are delivered at similar end points in their respective national curricula. In the AC, this work marks the end of a seven-year unbroken sequence of humanities education. In the FNCC, these subjects mark the end of a three- or four-year stage. Each curriculum aims to equip students with knowledge, understanding and skills associated with the people, places, issues and events that have shaped their world. Each curriculum draws upon the 'expanding communities' model to shape the context, scope and developmental sequence.

The AC: HASS is organised around questions and concepts, with the targeted inquiry skills organised developmentally or hierarchically according to the achievement standards. Knowledge and skills are mandated, with each content description supported by elaborations and suggestions for classroom implementation. The focus throughout AC: HASS is upon the expectations of student progress.

In contrast, the focus of these three subjects within the FNCC is upon the expectations of teachers and individual education providers. It is necessary to view the aims, objectives, scope and demands of each subject area as a developmental part of the stated mission of Finland's basic education to "build an extensive foundation of general knowledge and ability" in order to "promote equity, equality and justice" so that students grow "as human beings and into ethically responsible members of society" (FNBE, 2016, pp. 22-23). As stated by the FNBE (2016, p. 25), the seven transversal competences are not just integrated into each subject area; they are mandated as a "precondition for personal growth, studying, work and

civic activity now and in the future". To this end, the role of the local or municipal education provider is central to determining the structure, sequence, emphasis and monitoring of each subject.

With respect to instruction time in the AC: HASS, the possible amount of time allocated to the delivery of each subject area is indicated in the notional advice given to the curriculum writers:

Year 6 – 12% of time (4% History, 4% Geography, 2% Civics and Citizenship, 2% Economics and Business) (ACARA,2013, p. 9).

This curricular design contrasts with the FNCC which imposes no temporal or distribution parameters upon the delivery of its subject areas. In the FNCC, it is the local curriculum, as determined by each education provider, that is the “strategic and pedagogical tool that defines the policies for the education provider’s operation and the work carried out by the schools” (FNBE, 2016, p. 10).

Additional overall conclusions of the comparative analysis for Year 6/Grade 6 are contained in the statements for Year 10/Grade 9 at the end of the next section.

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: History (AC: H)

Geography (AC: G), Civics and Citizenship (AC: CC)

Economics and Business (AC: EB)

Finnish National Core Curriculum: History (FNCC: H)

Social Studies (FNCC: SS)

Geography (FNCC: G)

Expectations: Knowledge and Skills

The AC: HASS diverges in Year 7 to form four discrete subject areas for Year 7 through to Year 10. Students are able to learn AC: H, AC: G, AC: CC and AC: EB.

In Year 10, the AC: H focuses on the history of the modern world and on Australia from 1918 to the present, with an emphasis on Australia in a global context. The content is organised into two strands: inquiry and skills, knowledge and understanding. The inquiry and skills strand develops students’ capacity in chronology, terms and concepts, historical questions and research, analysis and use of sources, perspectives and interpretations, and explanation and communication. The three guiding inquiry questions are:

- How did the nature of global conflict change during the twentieth century?
- What were the consequences of World War II? How did these consequences shape the modern world?
- How was Australian society affected by other significant global events and changes in this period?

In Year 10, AC: G provides a study of environmental change and management, and geographies of human wellbeing. The content is organised into two strands: *inquiry and skills, knowledge and understanding*. The inquiry and skills strand develops students' capacity in observing, questioning and planning, collecting, recording, evaluating and representing, interpreting, analysing and concluding, communicating, and reflecting and responding. The three guiding inquiry questions are:

- How can the spatial variation between places and changes in environments be explained?
- What management options exist for sustaining human and natural systems into the future?
- How do world views influence decisions on how to manage environmental and social change?

In Year 10, the AC: CC provides a study of Australia's system of government and its global connections. The content is organised into two strands: skills, and knowledge and understanding. The skills strand develops students' capacity in questioning and research, analysis, research and interpretation, problem-solving and decision-making, and communication and reflection. The knowledge and understanding strand has three themes: *government and democracy, law and citizens, and citizenship, diversity and identity*.

The three guiding inquiry questions are:

- How is Australia's democracy defined and shaped by the global context?
- How are government policies shaped by Australia's international legal obligations?
- What are the features of a resilient democracy?

In Year 10, the AC: EB provides a study of Australia's economic performance and standard of living. The content is organised into two strands: *skills, and knowledge and understanding*, with the skills strand building students' capacity in *questioning and research, interpretation and analysis, economic reasoning, decision-making and application, and communication and reflection*. The four guiding inquiry questions are:

- How is the performance of an economy measured?
- Why do variations in economic performance in different economies exist?
- What strategies do governments use to manage economic performance?
- How do governments, businesses and individuals respond to changing economic conditions?

The FNCC: H is a three-year continuous course, commencing in Grade 7, that builds upon the learning experiences of Grades 4, 5 and 6. The FNCC: H in Grade 9 contains objectives of instruction that are organised into four strands: *significance, values and attitudes; acquiring information about the past; understanding historical phenomena; and applying historical knowledge*. There are six key content areas, and these can be sequenced either chronologically or thematically based upon the decisions of the local education provider:

- The origins and development of industrial society
- People changing the world
- Creating, building and defending Finland

- The Great War era
- Building the welfare state
- The origins of the world politics today.

The FNCC: SS is a three-year continuous course, commencing in Grade 7 and building upon the learning experiences of Grades 4, 5 and 6. The FNCC: SS in Grade 9 contains objectives of instruction that are organised into three strands: *significance, values and attitudes; adopting knowledge and skills needed in the society and societal understanding; using and applying societal power*. There are four key content areas:

- Daily life and personal life management
- Democratic society
- Active citizenship and involvement
- Economic activity.

The FNCC: G is a three-year continuous course, commencing in Grade 7. The FNCC: G in Grade 9 contains objectives of instruction that are organised into three strands: *geographical knowledge and understanding; geographical skills; and attitudes and values in geography*. There are six key content areas:

- The map and the regions of the world
- The current, changing world
- Basic conditions for life on Earth
- Changing landscapes and living environments
- People and cultures on Earth
- A sustainable way of living and sustainable use of natural resources.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 9 and Year 10, the expectations of the AC as expressed through the combined agency of four subject areas are deemed to be **comprehensive** in relation to breadth of coverage. The concepts and skills of AC: H, AC: G, AC: CC and AC: EB in Year 10 allow learners to build on experiences from each of these specific subject areas in Year 7 and Year 8. Each subject has its own collection of overarching concepts, inquiry questions, inquiry skills, knowledge and understanding, with associated elaborations to support teaching and learning.

Table 3. 14 Number of content descriptions in AC: H, AC: G, AC: CC, AC: EB, Year 10

Year 10	AC: H	AC: G	AC: CC	AC: EB
General capabilities	7	7	7	7
Cross-curriculum priorities	3	3	3	3
Inquiry questions	3	3	3	4
Content description: inquiry and skills	12	9	8	7
Elaborations	20	22	15	18
Content description: knowledge and understanding	21	11	8	5
Elaborations	32	35	14	21

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 9, the expectations of the FNCC: G, the FNCC: H and the FNCC: SS are **comprehensive** in relation to breadth of coverage.

During the three years of the FNCC: G, the content explores the interconnection between the map of the world and current world events. The aim of the FNCC: G is to “support the construction of the pupils’ worldview” (FNBE, 2016, p. 462). With the adoption of a multidisciplinary approach to examine the Earth, its natural regions, human activities and different cultures, students are expected to study the local region and specific examples from Finland, as well as undertaking field work and learning about electronic geographical information systems. Each of the seven transversal competences is referenced at least once, with most emphasis upon T4 (Multiliteracy) followed by T5 (ICT competence) and T7 (Participation and involvement in building a sustainable future).

The content identified for inclusion at some point during the three years of the FNCC: H offers a broad overview of world history from the 19th century to the present, with a focus on Finland. As in Grade 4 to Grade 6, the aim of the FNCC: H is to “develop the pupils’ knowledge of history and cultures and to encourage them to adopt the principles of responsible citizenship” (FNBE, 2016, p. 493). The content addresses the history of the students’ “family, region and local area, when appropriate” (FNBE, 2016, p. 495). Each of the seven transversal competences is referenced at least once, with most emphasis upon T1 (Thinking and learning to learn) and T2 (Cultural competence, interaction and self-expression), followed by T4 (Multiliteracy).

The content specified for inclusion in the three years of the FNCC: SS is designed to further familiarise students with the knowledge and skills to function within their community. The aim of FNCC: SS is, as it is in Grade 4 to Grade 6, to “support the pupils’ growth into active, responsible and enterprising citizens” (FNBE, 2016, p. 497). Each of the transversal competences is referenced at least once, with most emphasis upon T4 (Multiliteracy), followed by T7 (Participation and involvement and building a sustainable future).

Table 3. 15 Number of content descriptions in FNCC: H, FNCC: SS, FNCC: G, Grade 7-9

Grade 7-9	History	Social Studies	Geography
Objectives of instruction	12	9	13
Content areas	6	4	6
Transversal competences	7	7	7

AC – Depth

Depth: Fundamental

The expectations of the AC: HASS for Year 10 are **fundamental**, based on the details of knowledge and topics outlined in the curriculum. In Year 10, the AC: HASS expands to include four separate subject areas: History, Geography, Civics and Citizenship, and Economics and Business. Each has its own content descriptions (incorporating skills, knowledge and understanding) and associated elaborations to support teaching and learning. The depth to which learners should explore each content statement is indicated within its wording. Taken individually, each subject has the potential to be challenging in its depth. Taken collectively as a subject area, the coverage and mastery of its multiple components could be challenged by time constraints. The content descriptions primarily focus upon descriptions, explanations, interpretations and communication.

FNCC – Depth

Depth: Challenging

Based on the details of the knowledge and topics demanded by the curriculum, the level of depth of the FNCC: G, FNCC: H and FNCC: SS for Grade 9 is regarded as **challenging**.

In the FNCC: G the objectives of instruction across the three-year course provide guidance to teachers in relation to the detail required in the subject-specific student attitudes, skills, knowledge and understanding. The intention is for teachers to *support, guide, encourage* and *activate* students to *develop, examine, understand, make* and *appreciate*. The content areas are presented as short individual statements such as “focus on perceiving the world as a whole and learning key place names of Finland, Europe and the world”. The curriculum expects that “following the news is combined with the learning of other contents of geography” and that “the effects of globalisation and questions of regional developments are reflected on through examples” (FNBE, 2016, pp. 463-464). As there is relatively little specificity in the curriculum, the expectations of teachers may also be regarded as high in terms of programming.

In the FNCC: H the objectives of instruction for the three-year course provide guidance to teachers in relation to the subject-specific attitudes, understanding and knowledge. The intention is for teachers to *strengthen, activate, help, guide* and *encourage* students to *acquire, consider, understand, explain, analyse* and *evaluate*. The content areas are presented as short individual statements; for example, “pupils familiarise themselves with a phenomenon that has changed the lives of human beings and the relationship between humans and nature as well as the world” and “pupils are familiarised with changes that took

place in Science, arts and people’s beliefs” or “pupils familiarise themselves with the World Wars, the Cold War and surviving a war, particularly from the viewpoint of ordinary people and human rights issues” or “pupils explore the shared history of developed and developing countries and the origins of new kinds of political tensions in the world as well as solutions to them” (FNBE, 2016, pp. 495-496). Little detail is provided to support teachers in their programming.

In the FNCC: SS the objectives of instruction across the three-year course provide guidance to teachers in relation to the subject-specific attitudes, understanding and knowledge. The intention is for teachers to *guide* and *encourage* students to *deepen interest, practise, perceive, update, examine, understand, participate* and *critically evaluate*. Short statements reflect the expectations of learning, such as “pupils learn about different opportunities for planning their future by familiarising themselves with working life and industries”, students “examine how opinions are channeled into actions and decision-making by the individual, organisations, the media, and public authority in Finland and internationally” and “local and global viewpoints are taken into account in the examination of economic phenomena” (FNBE, 2016, p. 499).

Additional expectations of depth and detail are provided through the transversal competences which are linked to all content areas of the FNCC: G, FNCC: H and FNCC: SS. This linkage is indicated in the following table:

Table 3. 16 Number of references to transversal competences in FNCC: G, FNCC: H, FNCC: SS, Grade 7-9

Transversal competence	References in FNCC: G Grades 7-9	References in FNCC: H Grades 7-9	References in FNCC: SS Grades 7-9
T1: Thinking and learning to learn	3	12	4
T2: Cultural competence, interaction and self-expression	2	12	5
T3: Talking care of oneself and managing daily life	1	6	1
T4: Multiliteracy	5	11	8
T5: ICT competence	4	5	1
T6: Working life competence and entrepreneurship	1	3	2
T7: Participation, involvement and building a sustainable future	4	4	7

The programming and decisions through which these are implemented are matters for individual education providers, and it is expected that these decisions will consider “the pupil’s needs, local special features and the results of self-evaluation and development efforts” (FNBE, 2016, p.11).

AC – Rigour

Rigour: Challenging

The cognitive demand placed on Year 10 students in each of the four subject areas that comprise the AC: HASS indicates a **challenging** degree of rigour. The directive terms and expectations of students visible throughout the content descriptions of the four subject areas are predominantly associated with acquisition and application. Across all four subject areas, the following terms dominate the Year 10 achievement standards for the ‘typical’ student: *analyse, evaluate, apply and take action*.

FNCC – Rigour

Rigour: Challenging

Grade 9 students in the FNCC: G, FNCC: H and FNCC: SS encounter curriculum material that indicates a **challenging** degree of rigour. Each of the objectives of instruction is linked to its own detailed statement regarding student achievement at the level of ‘good’ (which is reported as numerical Grade 8). These statements describe what a student is ‘able’ to do or know at the end of the course, with many statements containing multiple parts and indicators. Each statement is linked to its own assessment target. In the FNCC: G, there are 13 separate statements and associated assessment targets. In the FNCC: H there are 12 separate statements and associated assessment targets. In FNCC: SS there are nine separate statements and associated assessment targets.

While the subject-specific assessment statements are dominated by terms such as *describe, identify and use*, there is some use of *formulate and interpret, compare and act*. These subject-specific assessment statements operate in conjunction with the mandated objectives of the transversal competences in Grade 3 to Grade 6. For example, in T1 (Thinking and learning to learn) there is an expectation that “thinking skills are practised by using problem-solving and reasoning tasks and working approaches that utilise and promote curiosity, imagination, inventiveness, and learning by doing” (FNBE, 2016, p.205). In T4 (Multiliteracy) teachers are expected to have students *analyse, compare and evaluate* as they develop “critical literacy in cultural contexts that are meaningful to the pupils” (FNBE, 2016, p. 207).

Again, it must be noted that decisions about programming and implementation are the responsibility of education providers, and it is expected that these decisions will also consider “the pupil’s needs, local special features and the results of self-evaluation and development efforts” (FNBE, 2016, p.11).

Comparative Analysis

The AC: H, AC: G, AC: CC and AC: EB in Year 10, and the FNCC: G, FNCC: H and FNCC: SS in Grade 9 occur at similar end points in their respective national curricula. In the AC these subjects mark the end of eleven years of continuous education in the humanities. In the FNCC these subjects mark the end of a three-year stage.

The AC: HASS in Years 7-10 replaces the four integrated sub-strands with four separate subject areas: History, Geography, Civics and Citizenship, and Economics and Business. Across all year levels, the targeted inquiry skills are organised developmentally or hierarchically according to the subject-specific aims and achievement standards. The

content in each subject is organised using questions and concepts, with detailed lists of mandated knowledge and skills, each of which is supported by elaborations and suggestions for classroom implementation. The focus throughout each curriculum is upon the expectations of student learning.

In comparison, the focus of these subjects within the FNCC is upon the expectations of teachers and individual education providers. It is necessary to view the aims and objectives of each subject area within the context of the stated mission of Finland's basic education to "build an extensive foundation of general knowledge and ability" in order to "promote equity, equality and justice" so that students grow "as human beings and into ethically responsible members of society" (FNBE, 2016, pp. 22-23). The seven transversal competences are integrated into each subject area, mandated as a "precondition for personal growth, studying, work and civic activity now and in the future" (FNBE, 2016, p.25). Again, the role of the local or municipal education provider is key to determining the structure, sequence, emphasis and monitoring of each subject.

The instruction time allocated to the delivery of each subject area is indicated in the notional advice given to the curriculum writers:

Year 10 – 17% of time (5% History, 5% Geography, 2% Civics and Citizenship, 5% Economics and Business)
(ACARA, 2013, p. 9)

This aspect of the design of the AC contrasts with the FNCC which imposes no temporal or distribution parameters upon the delivery of its subject areas, apart from indicating those that are core and those that are optional. The presence or absence of these parameters consequently impacts upon any judgement of breadth, depth and rigour regarding the content and expectations of the AC and the FNCC.

The overall conclusions drawn from this comparative analysis of the AC: HASS (including AC: H, AC: G, AC: CC and AC: EB) and the FNCC (including FNCC: ES, FNCC: G, FNCC: H and FNCC: SS) are that:

- both provide frameworks for teaching and learning that are developmentally and culturally appropriate
- the breadth of the AC: HASS expands over time, with the inclusion of four discrete subject areas from Year 7 to Year 10, and this may impact upon the depth with which the curriculum is implemented in schools or classrooms
- the breadth of the FNCC in ES, H, G and SS is written in bands and while it appears relatively narrow and lacking in detail, it affords each education provider with the freedom to explore topics and issues in a sequence or depth which it deems locally appropriate
- the AC: HASS provides details of student performance expectations via the achievement standards for each sub-strand and subject
- the FNCC provides details about student performance expectations through the descriptions of assessment at 'good' (numerical Grade 8) level

- while the AC: HASS is part of a three-dimensional curriculum with cross-curriculum priorities and general capabilities working to support and inform the subject areas, the FNCC is entirely founded upon the primacy of transversal competences
- both the AC: HASS and the FNCC rely on the programming and classroom practices of individual teachers, schools, or districts to fulfil their potential for student engagement and rigour in learning, with the AC: HASS providing greater specific support and guidance in these areas and the FNCC providing greater flexibility.

e) Technologies

Comparative Curricula

Australian Curriculum: Technologies	Version 8.3, 2016
Finnish National Core Curriculum: Crafts	Version 2016:5, 2014
Finnish National Core Curriculum: Environmental Studies	Version 2016:5, 2014
Finnish National Core Curriculum: Biology	Version 2016:5, 2014
Finnish National Core Curriculum: Home Economics	Version 2016:5, 2014
Finnish National Core Curriculum: Physics	Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2
Finnish National Core Curriculum: Grade 2

Learning Area/Subject

Australian Curriculum: Technologies (AC: T)
Finnish National Core Curriculum: Crafts (FNCC: C)
Aspects of Environmental Studies (FNCC: ES)

Expectations: Knowledge and Skills

The expected learning for the AC: T for Year 2 is presented in the achievement standards (subject-specific or learning area) for the Foundation to Year 2 band. Schools choose from two sets of achievement standards to report on student learning. The Technologies learning area has five key ideas (creating preferred futures, project management and types of thinking: systems, design and computational). There are two subjects: Design and Technologies and Digital Technologies; the two subjects have a common strand structure. The processes and production skills strand provides common threads that are addressed across both subjects. In the AC: Design and Technologies, students create designed solutions for each of the following prescribed technologies contexts: engineering principles and systems, food and fibre production/food specialisations, and materials and technologies specialisations. In Digital Technologies, students are expected to create a range of digital solutions through guided play and integrated learning as they explore digital systems and the representation of data and develop processes and production skills. Both subjects have a common strand structure (ACARA, 2017i).

In Finland, Technology education is addressed across a range of subjects in Grade 2, including Crafts and Environmental Studies. While there are three objectives and one content area in Environmental Studies that reflect some aspects of AC: Design and Technologies, most of the comparable content can be found in Crafts. Crafts is one of the artistic and practical subjects in Grades 1 to 9 and provides the opportunity for the development of processes and production skills. The expected learning for the FNCC: Crafts for Grade 2 focuses on the craft process. Self-assessment and peer assessment are important strategies in assessing achievement. Assessment focuses on progress in “working fluently, design, production and assessment skills, working in a goal-oriented manner and finding creative solutions” and “the educational task of Crafts is to guide pupils to understand cultural diversity and equity” (FNBE, 2016). Students are expected to design and produce a

craft product independently or collaboratively using a crafts process. There is a focus on developing creative thinking, design skills, spatial awareness and dexterity when using a range of materials. Connections are made to other learning areas and, in particular, to sustainable development, ways of living, cultural understanding, ethics and enterprise. An understanding of food preparation and healthy eating is addressed by the education provider through the school meals policy.

While the curriculum structures of the AC and FNCC are different, the intent in terms of creating solutions (making) is similar, at least with a focus on materials. The AC specifies a range of technologies to be addressed in Design and Technologies, whereas aspects of engineering, food and fibre production and food specialisations are addressed in the FNCC in Environmental Studies and through the school meals policy. There is no specific requirement to create solutions other than with materials.

The main difference between the two curricula lies in the expectations for knowledge and understanding, particularly in relation to Digital Technologies. In the FNCC, ICT is presented through the Competency framework ICT (C5) as an integrated approach across all Learning Areas, much like the AC: ICT capability. Further details on this are provided in the section on the General Capabilities.

Measurement of Curriculum: Breadth, Depth and Rigour

	Breadth			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC		CRAFTS/ES			CRAFTS/ES			CRAFTS/ES	

AC – Breadth

Breadth: Comprehensive

For students at the end of Year 2, the expectations of the AC: T are **comprehensive** in relation to breadth of coverage. They are expected to address fifteen content descriptions across two subjects: Design and Technologies and Digital Technologies. The content is presented in two strands: *knowledge and understanding* and *processes and production skills*. This content provides the opportunity to develop knowledge and understanding of technologies and society and three technologies contexts in Design and Technologies. Breadth of coverage is judged to be comprehensive as students explore a range of technologies contexts (engineering principles and systems, food and fibre production/food specialisations and materials and technologies specialisations). In Digital Technologies, they develop knowledge and understanding of digital systems and the representations of data. The breadth of the processes and production skills strand is comprehensive as it comprises five threads (*investigating and defining, generating and designing, producing and implementing, evaluating, and collaborating and managing*). Students are expected to create designed solutions (at least one product, one service and one environment) and digital solutions for a range of contexts from Foundation to Year 2.

Table 3. 17 *Distribution of content descriptions and elaborations across strands for AC, Year 2*

Year 2 Technologies	Strand: knowledge and understanding	Strand: processes and production skills	Total
Design and Technologies content descriptions	4	5	9
Elaborations	22	21	43
Digital Technologies content descriptions	2	4	6
Elaborations	12	20	32

FNCC – Breadth

Breadth: Fundamental

For students at the end of Grade 2, the expectations of the FNCC: C and FNCC: ES are **fundamental** in relation to breadth of coverage. The content in Crafts is presented as six content areas with an emphasis on students working through a craft process known as “Teaching and learning involve common themes and cooperation with different subjects” (FNBE, 2016). Students are expected to become familiar with and manipulate “many different materials” (FNBE, 2016). Suggested materials are “wood, metal, plastic, fibre, thread and fabric” (FNBE, 2016), and the focus is on students developing hands-on skills, observing, and experimenting. In Environmental Studies, students become familiar with a “diverse range of everyday technology and ... experiment, invent, build, and innovate”, “use information and communication technology in acquiring information and storing and presenting observations”, “experiment and find different alternatives and solutions to everyday problems” (FNBE, 2016). In the content areas focusing on “the basic necessities of life” *and* “practising a sustainable way of living” they “become acquainted with food production” and “learn about everyday health habits” (FNBE, 2016). However, in relation to digital technologies, the focus is on ICT capability rather than knowledge and understanding of digital systems, data or the processes and production skills associated with creating digital solutions.

AC – Depth

Depth: Fundamental

For students at the end of Year 2, the expectations of the AC: T are deemed to be **fundamental**. For example, in Digital Technologies, students “create and organise ideas and information using information systems independently and with others” (ACTIP006) and “recognise and explore patterns in data and represent data as pictures, symbols and diagrams” (ACDEK002). In Design and Technologies, students “explore how technologies use forces to create movement in products” (ACDK002) and “use personal preferences to evaluate the success of design ideas” (ACTDEP008).

While the majority of content descriptions provide opportunities for students to develop a fundamental level of depth, one or two content descriptions may be challenging as the

students are required to justify thinking. For example, learners are required to “consider sustainability to meet personal and local community needs” (ACTDEK001) (ACARA, 2017i).

FNCC – Depth

Depth: Fundamental

For students at the end of Grade 2, the expectations of the FNCC: C are rated as **fundamental**. For example, students “explore the diverse material and technological environment”, “follow the stages of a complete crafts process” and “familiarise themselves with the use of information and communication technology” (FNBE, 2016).

Some content in Crafts is more challenging, such as “practise giving feedback to other pupils” and “describing the process and the product” (FNBE, 2016). In Environmental Studies, students “consider the significance of their own actions for themselves, other people, and their surroundings” (FNBE, 2016, p.11). On balance, the depth of learning expected of students is fundamental.

AC – Rigour

Rigour: Moderate

In general, the level of rigour of the AC: T is deemed to be **moderate**. The cognitive demand placed on Year 2 students is straightforward; they require skills to develop knowledge and understanding by recognising, exploring, identifying and using. For example, they “explore needs or opportunities for designing” (ACTDEP005). The level of rigour is greater when students are expected to “generate, develop and record design ideas through describing, drawing or modelling” (ACTDEP006), “consider sustainability to meet personal and local community needs” (ACTDEK001) and “sequence steps for making designed solutions and working collaboratively” (ACDEP009) or “represent a sequence of steps and decisions (algorithms)” (ACTDIP004) (ACARA, 2017i). Forty-one elaborations provide pedagogical suggestions as to how the content descriptions could be addressed in the classroom, several of which provide opportunities for increased rigour.

FNCC – Rigour

Rigour: Moderate

The rigour of the FNCC: C is assessed as **moderate**, with the cognitive demand placed on Grade 2 students considered to be moderately challenging. The focus is on designing “based on the pupils’ personal feelings, stories, and imaginary environment as well as the built and natural environments” (FNBE, 2016). Students experiment with materials and develop appropriate skills to manipulate tools and equipment to produce products. They document the process of generating ideas and producing products. The rigour is more challenging when students are required to be creative, reflective and “learn about different approaches to self and peer assessment” (FNBE, 2016). In Environmental Studies the level of rigour is shown to be moderate when students are expected to “observe motion and consider the reasons that cause changes in motion”; it is more challenging when they “consider the significance of their own actions for themselves, other people, and their surroundings” (FNBE, 2016).

Comparative Analysis

The depth and rigour of the AC: T, the FNCC: C and FNCC: ES are comparable. The key difference between the AC and the FNCC is in relation to breadth. The breadth of learning in the AC is generally more challenging than in the FNCC as students address discipline-specific content (knowledge and understanding) both in Design and Technologies and Digital Technologies as well as applying this content when creating solutions (developing skills). In the FNCC, the breadth is predominantly in relation to materials, with aspects of technologies contexts such as engineering, food and fibre production or food specialisations addressed either in Environmental Studies or through the school meals policy. There is no Digital Technologies content.

While the FNCC presents ICT Competences as an overarching set of skills, the AC: T clearly distinguishes between teaching and learning expectations of the ICT capabilities and the Digital Technologies curriculum. As the two concepts are very different in ideology and implementation expectations, the breadth, depth and rigour of the AC: Digital Technologies and the Finnish ICT competences are not comparable.

Table 3.18 presents a quantitative indication that in Year 2 the AC and the FNCC differ in terms of breadth. The AC expresses content as knowledge and understanding and processes and production skills, whereas the content in the FNCC is presented as objectives and content areas which align more closely with the AC processes and production skills strand.

Table 3. 18 *Quantitative comparison of content from AC, Year 2 and FNCC, Grade 2*

Year 2	Australian Curriculum		Finnish National Core Curriculum	
	Technologies		Crafts	Environmental Studies related to Technology
General capabilities/ Transversal competence areas	7		7	
Cross-curriculum priorities	3		-	
Key ideas	5		-	-
Objectives	-		5	3
Knowledge and understanding content descriptions	Design and Technologies	Digital Technologies	-	-
	4	2	-	-
Elaborations	34		-	-
Processes and production skills/Content areas	9		6	3
Elaborations	41		-	-

The FNCC puts a strong focus on the development of self and peer assessment. The attention on creating positive learning environments and fostering positive approaches to learning and self-esteem is particularly significant.

Under the Basic Education Act, the aim of pupil assessment is to guide and encourage learning and to develop the pupil's capability for self-assessment. ... The emphasis is on assessment that promotes learning. Schools develop an assessment culture whose key features are... supporting the pupils in understanding their personal learning processes and making the pupils' progress visible throughout the learning process (FNBE, 2016).

In the AC, this focus on self-assessment is evident in the content description (ACTDEP008) "Use personal preference to evaluate the success of design ideas, processes and solutions including their care for the environment" (ACARA, 2017i) and is clearly evident in the Personal and Social Capability continuum.

Similar aspirations are reflected both in the Aims of the AC and the Objectives of Grades 1-2 FNCC in terms of design and technology but not in relation to digital technologies. The time allocation to the FNCC: C (4 hours weekly between the two years of Grades 1-2) is greater than that of the AC: T (20 hours per year). In addition, some aspects of Technology are addressed in Environmental Studies.

Both the AC and the FNCC provide the flexibility for integration with other subjects: "teaching and learning involve common themes and cooperation with different subjects" (FNBE, 2016). The AC provides resources for Curriculum Connections such as food and fibre production and food and wellbeing. In some Australian states and territories, and in some schools, Design and Technologies and Digital Technologies are addressed as an integrated subject. In addition, implementation may have an integrated STEM approach. For Design and Technologies, the opportunity to integrate with Science, for example, when exploring and creating solutions for engineered principles and systems, would reinforce concepts from physical science. A similar opportunity for integration presents itself in the FNCC when students "observe motion and consider the reasons that cause changes in motion" in Environmental Studies and have the opportunity in Crafts to "explore movement and balance" (FNBE, 2016).

In the early years, students are curious about their world and are interested in exploring it. In Foundation to Year 2, children have a strong sense of identity and are connected with, and contribute to, their world. They have a strong sense of wellbeing, are confident and involved learners and effective communicators. Both the AC: Technologies and the FNCC: Crafts and Environmental Studies give a sense of what a successful learner looks like at this stage. Apart from the specifics which differentiate the two in terms of breadth, there are similarities, particularly learning through purposeful and directed play, exploring materials, tools and equipment and developing design thinking and making skills. Niiranen & Rissanen (2017) highlight the importance of tacit knowledge in the FNCC, the importance of context in technology education and that the FNCC reflects Roberts' (2012) theory of "learning by doing" (Niiranen & Rissanen, 2017, p. 154). They suggest that "the hands-on nature of the subject provides pupils with the possibilities to both conceptualise scientific and technological knowledge as well as multiple strategies to put that knowledge into practical

uses” (Niiranen & Rissanen, 2017, p. 150). They cite Fain, Wagner & Vukasinovic (2016) who indicate “that problem-based learning can facilitate knowledge transfer, encourage and support collaborative work and improve students’ thinking and designing skills” (Niiranen & Rissanen, 2017, p. 152).

In the AC: T, students have opportunities to learn through purposeful and directed play to develop concern for the places and resources they use. Through these processes they identify relationships between imagined and virtual worlds and the real world, between people and products, and between resources and environments (systems thinking). They explore materials, tools and equipment and use drawing and modelling to communicate their design ideas. Students learn about and experience connections between technologies and the designed world (design thinking). They begin to learn the importance of preparing precise instructions when solving problems using digital systems (computational thinking), creating ideas and information and sharing them online with known people. In Design and Technologies and Digital Technologies, children create imaginary situations in which they change the meaning of objects and actions as they invent new ideas and engage in futures thinking (for them). They also explore real-world concepts, rules and events as they use role-play to explore what is familiar and of interest to them.

In the FNCC, students are encouraged to invent and experiment with crafts. Crafts is described as “an exploratory, inventive, and experimental activity in which different visual, material, and technical solutions as well as production methods are used creatively” (FNBE, 2016). There is an emphasis on developing spatial awareness, creativity and fine motor skills and “adopting ethical values and becoming informed, active, capable, and entrepreneurial citizens” (FNBE, 2016).

Additional Observations

Technology education in Grade 2 is addressed in a range of ways in the FNCC, through the Crafts and Environmental Studies and also through the provision of school meals. The school meals policy is enacted by the education provider and includes a free meal every day. It is designed to support healthy growth and development.

School meals have an important recreational role, and they promote a sustainable way of living, cultural competence and the objectives of food-related education and instruction in good manners.... The pupils are encouraged to take part in the planning, implementation and evaluation of school meals and the meal breaks in particular. The teachers provide guidance and education in connection with the meal together with other adults in the school (FNBE, 2016).

Aspects of technology education are addressed through the Finnish Transversal Competences, particularly such competences as *taking care of oneself and managing daily life, ICT competence, working life and entrepreneurship and participation, involvement and building a sustainable future*.

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: Technologies (AC: T)

Finnish National Core Curriculum: Crafts (FNCC: C)

Environmental Studies (FNCC: ES)

Expectations: Knowledge and Skills

The expected learning for the AC: T for Year 6 is presented in the achievement standards (subject-specific or learning area) for the Year 5 and 6 band. Schools choose from two sets of achievement standards to report on student learning.

The Technologies learning area has five key ideas (creating preferred futures, project management and types of thinking: systems, design and computational). There are two subjects: Design and Technologies and Digital Technologies. Both subjects have a common strand structure. The processes and production skills strand provides common threads that are addressed across both subjects. In the AC: Design and Technologies, students create designed solutions for each of the following prescribed technologies contexts: engineering principles and systems, food and fibre production/food specialisations, and materials and technologies specialisations. In the AC: Digital Technologies, students are expected to create a range of digital solutions to further develop understanding and skills in computational thinking such as identifying similarities in different problems and describing smaller components of complex systems.

In Finland, Technology education is delivered across a range of subjects in Grade 6, including Crafts and Environmental Studies. While there are four objectives and two content areas in Environmental Studies that reflect some aspects of AC: Design and Technologies, most of the comparable content can be found in Crafts. Crafts is one of the artistic and practical subjects in Grades 1 to 9 and provides the opportunity for the development of processes and production skills. The expected learning for the FNCC: Crafts for Grade 6, as with Grade 2, focuses on the craft process but contains an added emphasis on *managing*. The educational task is to “challenge the pupils to critically examine people’s consumer habits and the methods of production from the viewpoints of justice, ethics, and sustainable development” (FNBE, 2016). There is a greater emphasis on concepts, technical terminology and ways of communicating. The content areas reflect the craft process (producing ideas, design, experimentation, production, application and documentation). The assessment targets focus on the product and documentation of the process, the selection and combination of materials and skills using tools and equipment. Through the school meals policy, education providers are responsible for teaching students about food preparation and healthy eating.

While the curriculum structures of the AC and FNCC are different, the intent in terms of creating solutions (*making*) is similar, at least insofar as the focus on materials is concerned. The main difference between the two curricula lies in the expectations of knowledge and understanding, particularly in relation to Digital Technologies. The AC specifies a range of technologies to be addressed in Design and Technologies, whereas aspects of engineering,

food and fibre production and food specialisations are addressed in the FNCC in Environmental Studies and through the school meals policy. There is no specific requirement to design, make and evaluate designed solutions other than products using traditional materials.

The main difference between the two lies in the expectations for knowledge and understanding, particularly in relation to Digital Technologies. In the FNCC ICT is presented through the Competency framework ICT (C5) as an integrated approach across all Learning Areas, much like the AC: ICT capability. For more information see the section on the General Capabilities.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC		CRAFT/ES			CRAFT/ES			CRAFT/ES	

AC – Breadth

Breadth: Fundamental

For students at the end of Year 6, the expectations of the AC: T are **comprehensive** in relation to breadth of coverage. Students are expected to address eighteen content descriptions across two subjects: Design and Technologies and Digital Technologies. This content provides the opportunity to develop knowledge and understanding of technologies and society and three technologies contexts in Design and Technologies. The breadth is regarded as comprehensive because students explore a range of technologies contexts (engineering principles and systems, food and fibre production/food specialisations and materials and technologies specialisations). The breadth of the processes and production skills strand is comprehensive as it comprises five threads (investigating and defining, generating and designing, producing and implementing, evaluating, and collaborating and managing). Students are expected to create designed solutions (at least one product, one service and one environment) and digital solutions for a range of contexts from Year 5 to Year 6. In Digital Technologies they develop knowledge and understanding of digital systems and the representations of data. In Digital Technologies, students define problems and design, and they implement and evaluate a range of digital solutions, including visual programming.

Table 3. 19 *Distribution of content descriptions and elaborations across strands for Year 6*

Year 6 Technologies	Strand: knowledge and understanding	Strand: processes and production skills	Total
Design and Technologies content descriptions	4	5	9
Elaborations	25	24	49
Digital Technologies content descriptions	2	7	9
Elaborations	10	38	48

FNCC – Breadth

Breadth: Fundamental

For students at the end of Grade 6, the expectations of the FNCC for Crafts and Environmental Studies are deemed to be **fundamental** in relation to breadth of coverage. The learning content in Crafts is presented as six content areas with an emphasis on students working through a craft process. Students “learn to know, understand, and apply different materials and techniques creatively while making use of what they have learned in other subjects and learning environments” (FNBE, 2016). They “study and apply the strength and flexibility properties of materials ... [and] examine the structures and the use of energy in materials” (FNBE, 2016). The breadth is extended in the Production content area when students “practise with functions produced with the help of programming, such as robotics and automation” (FNBE, 2016). In Environmental Studies, students become familiar with the technology used in everyday situations, and “explore the operating principles and structures of different equipment” (FNBE, 2016). They learn about “the reproduction of animals and plants, the production and routes of food as well as the commercial use of forests” (FNBE, 2016). However, in relation to digital technologies the focus is on ICT capability rather than knowledge and understanding of digital systems, data or the processes and production skills associated with creating digital solutions.

AC – Depth

Breadth: Challenging

For students at the end of Year 6, the expectations of the AC: T are considered **challenging**. The AC requires students to “investigate how and why” (ACTDEK021), allowing depth in communicating ideas and processes. Students are also asked to “critique needs or opportunities...” (ACTDEP024) (ACARA, 2017i) providing an opportunity for deep understanding. Strategic thinking is evident when students are planning, creating and communicating ideas and information, negotiating criteria and evaluating. The transfer of knowledge and skills from one context to another provides opportunities for deeper engagement and the depth to which learners may explore each content description is clearly indicated in the 97 elaborations provided across the two subjects.

FNCC – Depth

Depth: Fundamental

The depth of learning expected of students in Craft is rated as **fundamental**. For example, students “experiment with different materials and techniques” and “use and combine different colours, patterns, textures, styles, and shapes” (FNBE, 2016).

Some content in Crafts is more challenging, such as “documenting the plan verbally and/or visually as well as numerically, for example using measurements, quantities, and scales” and using “the plans they have drawn up themselves” (FNBE, 2016). In Environmental Studies, a student will be encouraged to “act and become involved in his or her surroundings and community in order to promote sustainable development and to appreciate the significance of sustainable development to himself or herself and the world” (FNBE, 2016). On balance, the expectation of depth is fundamental.

AC – Rigour

Rigour: Challenging

The rigour of the AC: T is deemed to be **challenging**. The cognitive demand placed on Year 6 students is significant as they develop knowledge and understanding by investigating, evaluating, critiquing and negotiating criteria for success. For example, they are expected to “negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions” (ACTDEP027). Students plan and work collaboratively, including online sharing of ideas, to “develop project plans that include consideration of resources when making designed solutions individually and collaboratively” (ACTDEP028). In Digital Technologies, students “define problems in terms of data and functional requirements drawing on previously solved problems” (ACTDIP017) and “design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition)” (ACTDIP019) (ACARA, 2017i). Multiple elaborations provide pedagogical suggestions for how the content descriptions could be addressed in the classroom, several of which identify opportunities for increased rigour.

FNCC – Rigour

Rigour: Moderate

The level of rigour of the FNCC: C is assessed as **moderate**. The cognitive demand placed on Grade 6 students is sometimes challenging; for example, when students are taking greater responsibility for managing the craft process, they “make a work plan for producing their own product or piece” and “work according to the plans they have drawn up themselves” (FNBE, 2016). In general, the cognitive demand as described in the curriculum is moderate. An example is found in Environmental Studies when teachers “instruct the pupil to use information and communication technology responsibly, safely, and ergonomically for acquiring, processing, and presenting information and as a means of interaction” (FNBE, 2016).

Comparative Analysis

The AC: T and the FNCC: CES are not comparable. The breadth of learning in the AC is generally more comprehensive than in the FNCC as students address discipline-specific content (knowledge and understanding) both in Design and Technologies and Digital Technologies and apply this content when creating solutions. While aspects of engineering, food and fibre production or food specialisations have the potential to be addressed either in Environmental Studies or through the school meals policy, the specific requirements are not clear. There is no Digital Technologies content. In the FNCC, the breadth is seen predominantly in relation to materials.

The AC: T clearly distinguishes between teaching and learning expectations of the ICT capabilities and the Digital Technologies curriculum. The FNCC presents the ICT Competences as the overarching umbrella. As the two concepts are very different in ideology and implementation expectations, the breadth, depth and rigour of the AC: Digital Technologies and the Finnish ICT competences are not comparable.

Table 3.20 presents a quantitative indication that in Year 6 the AC and the FNCC differ in terms of breadth. The AC expresses content as knowledge and understanding and processes and production skills, whereas the content in FNCC is presented as objectives and content areas which align more closely with the AC processes and production skills strand.

Table 3. 20 *Quantitative comparison of content from AC, Year 6 and FNCC, Grade 6*

Year 6	Australian Curriculum		Finnish National Core Curriculum	
			Crafts	Environmental Studies related to Technology
	Technologies			
General capabilities/ Transversal competence areas	7		7	
Cross-curriculum priorities	3		-	
Key ideas	5		-	-
Objectives	-		7	4
Knowledge and understanding content descriptions	Design and Technologies	Digital Technologies	-	-
	4	2	-	-
Elaborations	34		-	-
Processes and production skills/Content areas	9		6	2
Elaborations	41		-	-

With regard to design and technology, similar expectations are reflected both in the Aims of the AC and the Objectives of Grades 3-6 in the FNCC; this is not true of digital technologies. The time allocation to the FNCC: C (5 hours weekly between the four years of Grades 3-6) is

greater than that of the AC: T (average of 50 hours per year). In addition, some aspects of Technology are addressed in Environmental Studies.

Through the primary years, students draw on their growing experience of family, school and the wider community to develop their understanding of the world and their relationships with others. During these years of schooling, students' thought processes become more complex and consistent, and they gradually become more independent. Students also develop their capacity to work in teams. They develop a sense of social, ethical and environmental responsibility and are interested in and concerned about the future (systems thinking). Students may share changes in their own thinking and making, giving reasons for their actions and explaining and demonstrating their organisation and sequence of ideas. They begin to recognise and appreciate the different ways in which others think and respond to problems and situations, including those with a regional perspective. Students respond resourcefully to a range of design and computing problems and situations using creative and innovative ideas to realise solutions. They communicate and record their ideas in diagrams and drawings using a range of technologies. Students explain the main functions of their solutions and the systems, materials, tools and equipment which could be used (ACARA, 2017i).

In the FNCC, the "pupils' different interests and shared activities are emphasised in the teaching and learning of crafts" (FNBE, 2016). Creativity is emphasised in Crafts, with students exploring the properties of materials, being inventive and experimental and, combined with pursuing their own interests, may lead to high levels of student engagement. The focus on student choice is a pedagogical decision. The flexible design of the AC: Technologies lends itself to a similar approach.

There is a strong focus on assisting students to develop ethical values and become "informed, active, capable, and entrepreneurial citizens" (FNBE, 2016), all of which mirrors the intent of Australia's Melbourne Declaration. In the AC this is reflected in the inclusion of the overarching key idea of "creating preferred futures", which links strongly to the cross-curriculum priority of Sustainability.

The significant difference between the AC and the FNCC is the aspect of a successful learner that focuses on responding to a range of computing problems. While this is an expectation for the AC, it is not specified in the FNCC. The position adopted by the AC is supported by the Horizon Report K-12 Edition (2016) which identifies coding as a literacy (Adams Becker, Freeman, Giesinger Hall, Cummins, & Yuhnke, 2016).

The place of ICT in the FNCC has changed significantly from 2004 to 2014. Pirhonen (2016, p. 388) analysed the references to technology across the FNCC and how technology is framed.

The new, 2014 version of the Core Curriculum of Basic Education places a strong emphasis on certain kinds of technology, namely information and communication technology (ICT). In that document ICT is referred to much more frequently than technology in general. As a topic, ICT has been found to be so central that it has been included as one of the seven first level objectives, titled 'ICT ability'.

The FNCC identifies the following six main characteristics of successful integration:

1) ICT is included in strategic planning, as part of school culture; 2) teaching and learning methods facilitate participation and leading to empowerment; 3) flexible curricula; 4) high investments in communication; 5) optimal leadership and management; and 6) teaching staff's strong capacity and commitment (FNBE, 2016).

Additional Observations

There is a new expectation in the 2014 curriculum that all students work with a range of materials, reversing the previous expectation that girls worked only with textiles. Crafts is an integrated subject both for boys and girls.

The main change from the NCCBE 2004 is the fact that the core contents of technical craft and textile craft will no longer be taught or referred to separately ... the most influential element in girls' interests towards technical craft and technology education would be the possibility to make meaningful, useful and motivating projects that would be connected with girls' everyday life. Therefore, activities during craft lessons should be planned and presented in such a way that all pupils would be interested in them and might see technology education as something valuable for them. (Niiranen, Female technical craft teachers in a key role in developing Finnish technology education, 2016, pp. 354-357)

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: Technologies (AC: T)

Finnish National Core Curriculum: Crafts (FNCC: C)

Biology (FNCC: B)

Physics (FNCC: P)

Home Economics (FNCC: HEc)

Expectations: Knowledge and Skills

The expected learning for the AC: T for Year 10 is presented in the subject-specific achievement standards for the Year 9 and 10 band. Five key ideas are found in this learning area: Creating preferred futures, Project management and Types of thinking: systems, design and computational. There are two optional elective subjects: Design and Technologies and Digital Technologies. Australian states and territories may offer other Technologies electives that do not duplicate the content of the AC.

Both subjects have a common strand structure, with the processes and production skills strand containing threads that are addressed across both subjects. In the AC: Design and Technologies, students create designed solutions for one or more of the following prescribed technologies contexts: engineering principles and systems, food and fibre production, food specialisations, materials specialisations and technologies specialisations. In the AC: Digital Technologies students are expected to create a range of digital solutions to develop understanding and skills in computational thinking such as precisely and accurately describing problems and using modular approaches to solutions.

In Finland, Technology education is addressed across a range of subjects in Grade 9 including Crafts, Biology, Physics and Home Economics, the last also available as an optional subject. One content area of Biology, *Toward a sustainable future*, reflects aspects of the food and fibre production technologies context of the AC: Design and Technologies. In Physics, there are references to technological applications, designing, developing and applying. Most of the comparable content can be found in Crafts. Crafts is one of the artistic and practical subjects in Grades 1 to 9 and provides the opportunity for the development of processes and production skills. The expected learning for the FNCC: Crafts for Grade 9, as with Grades 2 and 6, focuses on the craft process but places an added emphasis on strengthening and deepening “innovation and problem-solving skills” (FNBE, 2016). The educational task is to “support the pupils’ well-being and life management skills as well as their choices related to working life and professions” (FNBE, 2016). There is a greater emphasis on society, enterprise and careers. The content areas reflect the craft process (producing ideas, design, experimentation, documentation and assessment, production, occupational safety) and technology and society (entrepreneurial learning and awareness and participation). Home Economics focuses on skills of practical working, cooperation and interaction and information management across three content areas: food, housing and consumer and financial skills.

Grade 9 students in Finland are the same age as Year 10 students in Australia. Although not all Australian students will choose to study Technologies, it is appropriate to compare the content. As with Year 2 and Year 6, the main difference between the two lies in the expectations for knowledge and understanding, particularly in relation to Digital Technologies. The AC allows for specialisation in Design and Technologies. In the FNCC, the materials focus continues in Crafts but with greater attention to multi materials, and the food specialisations are presented through Home Economics. References to engineering are integrated in Physics, and aspects of food and fibre production are addressed in Biology. However, there are not specific requirements for students to create technological solutions.

The main difference between the two curricula lies in the expectations for knowledge and understanding, particularly in relation to Digital Technologies. In the FNCC, ICT is presented through the Competency framework ICT (C5) as an integrated approach across all Learning Areas, much like the AC: ICT capability. More detail is provided in this paper’s section on the AC’s General Capabilities.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC			CRAFTS/Bio/ Phys/HEc			CRAFTS/Bio/ Phys/HEc			CRAFTS/Bio/ Phys/HEc

AC – Breadth

Breadth: Comprehensive

For students at the end of Year 10, the expectations of the AC: T are **comprehensive** in relation to breadth of coverage. Both subjects are optional electives. Students may address

up to 23 content descriptions across the two subjects of Design and Technologies and Digital Technologies. This content provides the opportunity to develop knowledge and understanding of technologies and society and five technologies contexts in Design and Technologies. This would be dependent on the technologies contexts selected. The breadth is comprehensive as students explore a range of technologies contexts (engineering principles and systems, food and fibre production, food specialisations, materials specialisations and technologies specialisations). By the end of Year 10, students will have had the opportunity to design and produce designed solutions for one or more of these contexts. In Digital Technologies, they develop knowledge and understanding of digital systems and the representations of data; they also analyse problems and design, implement and evaluate a range of digital solutions, including object-oriented programming.

Table 3. 21 *Distribution of content descriptions and elaborations across strands for AC, Year 10*

Year 10 Technologies	Strand: knowledge and understanding	Strand: processes and production skills	Total
Design and Technologies content descriptions	7	5	12
Elaborations	34	26	60
Digital Technologies content descriptions	2	9	11
Elaborations	10	44	54

FNCC – Breadth

Breadth: Comprehensive

Grade 9 students encounter expectations in Crafts and in aspects of Technology education addressed in Biology, Physics and Home Economics that are regarded as **comprehensive** in terms of breadth of coverage. The content in Crafts is presented as eight content areas with an emphasis on students exploring built environments, multi materials and combining different content using a craft process. Students “practise different ways of modifying, combining, and handling materials” (FNBE, 2016). In Biology, students “reflect on the ecological, social, economic, and ethical principles of ... sustainable food production” and in Physics, one of the objectives indicates that students will “understand the operating principles and significance of technological applications and ... participate in forming ideas for simple technological solutions and designing, developing, and applying them in cooperation with others” (FNBE, 2016). In Home Economics, students learn to plan and produce meals, considering nutritional recommendations, safety and ethics. However, in relation to digital technologies the focus is on ICT capability rather than knowledge and understanding of digital systems, data or the processes and production skills associated with creating digital solutions.

AC – Depth

Depth: Challenging

For students at the end of Year 10, the expectations of the AC: T are deemed to be **challenging**. The AC: Design and Technologies requires students to “investigate and make judgements” in all contexts (ACTDEK043–ACTDEK047). Higher-order thinking is needed when considering the “impact of technologies on preferred futures” (ACTDEK041), “planning and managing projects” (ACTDEP052). They are expected to be “evaluating critically” and “to take account of future risks and sustainability” (ACTDIP042) (ACARA, 2017i). The depth to which learners may explore each content statement is described in multiple elaborations which provide pedagogical support for classroom implementation.

FNCC – Depth

Depth: Challenging

The expectations of the FNCC: C are **challenging** at Grade 9. For example, students “implement their designs, strengthening their self-expression” and embed programming systems in their production methods (FNBE, 2016). In Physics, students demonstrate knowledge and skills by working “in cooperation in forming ideas for a technological solution as well as planning, developing, and applying it” and in Biology they discuss “the opportunities provided by bioeconomy and ecosystem services for a sustainable future” (FNBE, 2016). In Home Economics, students consider a range of competing factors when planning and implementing meals, including nutrition, food safety, ethics, economics, consumer information and cultural perspectives.

AC – Rigour

Rigour: Challenging

The rigour of the AC: T is considered to be **challenging**. Year 10 students are expected to investigate and make judgements, analyse, critique and evaluate. For example, the Design and Technologies curriculum asks students to “investigate and make judgments on how the characteristics and properties of materials are combined with force, motion and energy to create engineered solutions” (ACTDEK043). Students are expected to use creative thinking skills and work collaboratively to create designed solutions. In Digital Technologies, students “design algorithms ... and validate algorithms and programs through tracing and test cases” (ACTDIP040) (ACARA, 2017i). They establish comprehensive criteria for success, including sustainability considerations, and use these to evaluate their ideas and designed solutions and processes. They create and connect design ideas of increasing complexity and justify decisions. Some 114 elaborations provide pedagogical suggestions for how the content descriptions could be addressed in the classroom, several of which descriptions provide opportunities for increased rigour.

FNCC – Rigour

Rigour: Challenging

The rigour of the FNCC: C is rated as **challenging**, and there is evidence of the significant cognitive demand placed on Grade 9 students across a range of subjects in relation to

Technology education. This is seen, for example, in Crafts when students are asked to “think economically and ... make choices in the crafts process that promote a sustainable way of living”, “analyse the design and user-friendliness of product” and “reflect on crafts as a means of promoting well-being and sustainable development in daily life” (FNBE, 2016). In Biology, the level of rigour is challenging when students “reflect on the ecological, social, economic, and ethical principles of using natural resources, as well as sustainable food production and animal welfare” (FNBE, 2016). In Physics it is challenging when students “describe how competence in Physics is needed for building a sustainable future” (FNBE, 2016). These are sophisticated expectations for students in this age group and are evidence of a consistent focus on contemporary global issues.

Comparative Analysis

While the structures of the AC: T for Year 10 and the FNCC for Grade 9 are different, the breadth, depth and rigour are comparable. The alignment between the subjects and technologies contexts of the AC and the range of subjects addressing aspects of Technology education in the FNCC are illustrated in Table 3.22 below. Some are only partially aligned; for example, in the FNCC, Physics addresses some aspects that could be covered in the AC Design and Technologies (engineering principles and systems).

Table 3. 22 Alignment of AC Technologies subjects and contexts to FNCC subjects

Australian Curriculum	Finnish National Core Curriculum
Design and Technologies (engineering principles and systems)	Physics
Design and Technologies (food and fibre production)	Minor reference in Biology
Design and Technologies (food specialisations)	Home Economics
Design and Technologies (materials specialisations)	Crafts
Design and Technologies (technologies specialisations)	Crafts
Digital Technologies	N/A

While the depth and rigour are comparable, the comparability of breadth is not completely balanced across all technologies contexts, and there is a stronger alignment in relation to Materials and technologies specialisations.

The AC: T clearly distinguishes between teaching and learning expectations of the ICT Capabilities and the Digital Technologies curriculum. The FNCC has ICT Competences as its overarching umbrella term. As the two concepts are very different in ideology and implementation expectations, the breadth, depth and rigour of the AC: Digital Technologies and the Finnish ICT competences are not comparable.

The table below provides a quantitative indication that the AC and the FNCC differ in terms of structure and breadth for Year 10/Grade 9.

Table 3. 23 *Quantitative comparison of content from AC, Year 10 and FNCC, Grade 9*

Year 10/Grade 9	Australian Curriculum		Finnish National Core Curriculum			
	Technologies		Crafts	Subjects related to Technology		
General capabilities/ Transversal competence areas	7		7			
Cross-curriculum priorities	3		-			
Key ideas	5		-	-		
Objectives	-		8	Bio	Phys	HEc
				-	3	3
Knowledge and understanding content descriptions	Design and Technologies	Digital Technologies				
	4	2	-	-	-	-
Elaborations	34		-	-	-	-
Processes and production skills/Content areas	9		8	1	3	3
Elaborations	41		-	-	-	-

Students in this age range increasingly look for and value learning they perceive to be relevant, consistent with personal goals, and which will have the potential to lead to important outcomes. Increasingly, students analyse and work with more abstract concepts, consider the implications of individual and community actions and are keen to examine evidence prior to developing ideas. The alignment of school subjects to possible study and career paths becomes more targeted. Both the AC and the FNCC suggest what a successful learner looks like at this stage.

In the AC, students use their knowledge and understanding of technologies, processes, production skills, systems, design, and/or computational thinking to solve and produce creative solutions to problems, needs or opportunities. They communicate and record their ideas using a range of media and technologies. These specialised problem-solving activities will be sophisticated, acknowledge the complexities of contemporary life and may make connections to related specialised occupations and further study. Students develop a global perspective; they have opportunities to understand the complex interdependencies involved in the development of technologies and between the developer and user in their solutions, and how these can contribute to preferred futures. Students develop an understanding of the interdependence of technologies development, values, beliefs and environment (systems thinking). Through undertaking technologies processes, students develop systems, design and computational thinking; and organisational and project management skills (ACARA, 2017i).

In Finland, the emphasis in Grades 7-9 is on guiding and supporting students in the completion of their basic education and students “begin to build their adult identities, increase their knowledge and skills, discover their direction, and prepare for life after basic

education” (FNBE, 2016). In relation to the FNCC: C, the focus is on developing confidence and persistence in following and managing the craft process and becoming innovative. Students “are also encouraged to value and express their own craftsmanship and to strive to maintain and develop the culture of crafts” (FNBE, 2016). The final assessment criteria for Crafts encourages students to work independently and collaboratively as they seek, create and document the production of solutions, make choices, self-assess, apply key concepts, evaluate risks and work safely. They are expected to “describe the significance of crafts to society” and “explain and justify the significance of crafts for a sustainable way of living” (FNBE, 2016). Such goals formed part of the research of Pirhonen (2016), whose “central finding was that, in general, the Finnish educational system is very ambitious. Its objective is to educate active, independent, critical, self-regulated, creative constructors of the future, whose activities are based on the shared ethical values of society”.

Additional Observations

In Finland, the government decrees the volume of instruction time in the learning areas, as follows:

the minimum numbers of lesson hours reserved for core instruction in each artistic and practical subject in Grades 1–6 and 7–9 (music, visual arts, crafts, physical education, home economics). In addition, a total of five annual weekly lessons in Grades 1–6 and six in Grades 7–9 are reserved for instruction in these subjects, which are referred to as optional lessons in artistic and practical subjects in the distribution of lesson hours. Optional lessons are part of the instruction in artistic and practical subjects taught as core subjects, and they are also assessed as part of this instruction. The decisions on how these optional lesson hours are used are made by the education provider (FNBE, 2016).

In Australia and internationally, there is frequent criticism in mainstream media and by many educators that students are less creative and that school reduces creativity. Lindfors (2016), for example, highlights that “in the new Finnish National Core Curriculum 2014 for Basic Education ... the focus is on developing students’ exploratory, creative, active, and entrepreneurial future-oriented working”.

By international comparison, only 18.8% of Finnish students reported using ICT for projects or class work (OECD, 2015a). This compares to 73.9% in Denmark or 44.7% in the Slovak Republic. A recent government report shows that 70% of basic education school teachers have a positive attitude to ICT. About half of all Finnish teachers feel they have basic digital skills and 20% report significant shortcomings. About the same number of teachers uses ICT on a weekly basis, but students use it less often for educational purposes. Digital literacy is well-embedded in the curriculum reform.

A high percentage of the Finnish population uses technology at home or in educational facilities. Based on 2014 survey results, per percentage of population, Finland sits higher than Australia for technology use in two age brackets: adults aged between 16 and 24 and between 65 and 74.

Despite this high usage of technology, the proportion of students who did not use ICT in schools at all during 2016 is highest in Finland (31%), compared with the EU average of 20%. Despite the seemingly good infrastructure, the students per PC ratio in Finland is only

around the EU average. A lack of devices for students potentially limits students' opportunities to use ICT in schools.

For the first time, PISA 2012 measured how much time, during a typical school week, students spent using the internet at school and at home, both on school days and during weekends. The data demonstrates that 15-year-olds spent the most time on Internet activities outside school. On average across OECD countries 15-year-olds spent about 2.29 hours per day on the internet outside school, and only 0.64 hours at school. In Australia, Denmark, Estonia, Norway, the Russian Federation and Sweden, more than one in four students spend over four hours per weekday online outside of school (OECD, 2015b, p. 39).

f) Health and Physical Education

Comparative Curricula

Australian Curriculum: Health and Physical Education	Version 8.3, 2016
Finnish National Core Curriculum: Environmental Studies	Version 2016:5, 2014
Finnish National Core Curriculum: Health Education	Version 2016:5, 2014
Finnish National Core Curriculum: Physical Education	Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2
Finnish National Core Curriculum: Grades 1-2

Learning Area/Subject

Australian Curriculum: Health and Physical Education (AC: HPE)
Finnish National Core Curriculum: Environmental studies (FNCC: ES)
Physical Education (FNCC: PE) and Transversal competence (FNCC: TC), Taking care of oneself and managing daily life (T3)

Expectations: Knowledge and Skills

The AC: HPE is articulated through two interrelated strands of *Personal, social and community health* and *Movement and physical activity*. By the age of seven, students are expected to be able to make simple decisions and start taking action to keep themselves and others healthy, safe and physically active. Being able to recognise opportunities for health, safety and wellbeing promotion; examine health-related messages; and recognise, respect and celebrate diversity are all strategies that are foundational for future learning. Building on previous learning, students identify how emotional responses impact on others' feelings, develop personal and social skills and some help seeking strategies. The curriculum expects students to broaden the range and complexity of their fundamental movement skills and investigate the body's response to different types of physical activities. The AC: HPE is distinguished by an expectation that Year 2 students are able to test alternatives to solve movement challenges and have the capacity to recognise how strengths and achievements contribute to their own and others' identities (ACARA, 2017j).

In relation to health and physical education, the Finnish curriculum in Grade 1-2 is described through key content areas in Physical Education, the integrated subject of Environmental Studies, and the Transversal competence of *Taking care of oneself and managing daily life*. Students develop their physical, social and psychological capacity to function in all spheres of life. Seven-year-old students are expected to cooperate with and help others, try new and different activities and be aware of safe traffic behaviour. Some food and wellbeing curriculum content is delivered through daily school meals.

The AC: HPE and the FNCC are comparable and explicit in requiring Year 2 students to make healthy choices, be physically active in a variety of ways and build healthy relationships. Both curricula encourage a focus on safety, following rules, curiosity and outdoor play and expect seven-year-olds to apply their learning to their own lives to keep themselves and others safe. Flexibility is provided in both curricula. In Finland this includes

explicitly taking the seasons into account and involving students in determining specific curriculum content. The FNCC has a more explicit focus on curiosity, expression skills, using the senses, *testing the boundaries of his or her psychological functional capacity* and mastering swimming skills (FNBE, 2016).

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC		PE/ES			PE/ES			PE/ES	

AC – Breadth

Breadth: Comprehensive

For students in Year 2, the expectations of the AC: HPE are **comprehensive** in relation to breadth of coverage. The curriculum expects teachers to cover 17 content descriptions as well as nine focus areas over Years 1 and 2. This content, supported by 57 elaborations, covers a comprehensive range of health and physical activity topics from understanding identities and valuing diversity to developing movement concepts and strategies in games. Students are expected to demonstrate a wide range of understanding and skills that will assist them to make simple but informed decisions about health, safety and being active, as described in the Years 1 and 2 achievement standard. The AC: HPE also draws upon general capabilities, particularly personal and social capability, critical and creative thinking and ethical understanding, to enhance the curriculum.

FNCC – Breadth

Breadth: Fundamental

The expectations of the FNCC curriculum are **fundamental** in relation to breadth of coverage. Although health and physical education is delivered through three explicit curriculum content areas, the topics build on limited topics to expand on knowledge. There are four key content areas related to environmental studies: *growth and development, acting at home and schools, reflecting on the necessities of life, and practising a sustainable way of living* (FNBE, 2016). This content is designed to cover movement, safety and working in groups. In PE there are three key content areas. These cover the three functional capacities: physical, social and psychological. PE content focuses on: finding movement solutions, learning fundamental movement skills, acting safely and working independently as well as with others. The number of objectives is limited to 10 in PE and 3 health-related objectives in Environmental Studies.

AC – Depth

Depth: Fundamental

The expectations of the AC: HPE are regarded as **fundamental**. The depth to which learners are encouraged to explore content includes connecting foundational knowledge and

observations with more abstract concepts such as identity. Students are also expected to move beyond recall to show that they can apply their reflections to their sense of self as well as transfer their movement skills to a range of situations. Deep and creative thinking is encouraged, whereby students are expected to create games and movement sequences to solve movement challenges. Connecting learning between strands, sub-strands and threads enables application of understanding to a range of contexts. For example, in the “interacting with others” thread, describing ways to include others to make them feel they belong (ACPPS019) is related to expected learning from the “team work and leadership” thread, and students use strategies to work in group situations when participating in physical activities (ACPMP030) (ACARA, 2017j).

FNCC – Depth

Depth: Challenging

On balance, the expectations of the Grade 2 FNCC are **challenging** in relation to depth. As with other content, students are expected to participate in integrated curriculum that allows students to transfer their learning. The multidisciplinary nature of environmental education, through which health education is delivered, requires that pupils *acquire, process, produce, present, evaluate and appraise information in different situations*. Students are expected to carry out simple research projects and reflect on different perspectives and solutions. They are also expected to apply their learning at home as well as at school. For example, preventing bullying, using simple self-care skills, and seeking help. Self-expression, decision making and applying physical skills across different learning environments are expected of Grade 2 students in physical education.

AC – Rigour

Rigour: Moderate

The terminology and expectations of the AC: HPE (Year 2), as shown in the content descriptions, are predominantly associated with the development of skills and concepts (see Webb’s DoK, 1997), indicating a **moderate** degree of rigour in the Year 2 HPE curriculum. The cognitive demand placed on Year 2 students in the AC: HPE content requires them to develop skills and understanding through comparing, applying, describing and explaining, supported by the elaborations tied to a content point. The expected learning also utilises creative and collaborative skills for enabling students to apply solutions to their own issues and everyday lives. Multiple elaborations provide additional suggestions designed to encourage multiple approaches and solutions to stretch students’ cognitive capacity. The Year 2 achievement standards for AC: HPE use verbs such as *identify, describe, examine, demonstrate, select* and *apply*.

FNCC – Rigour

Rigour: Moderate

The key content areas and objectives of instruction for Grade 2 indicate a **moderate** degree of rigour. The Environmental Studies curriculum expects that Year 2 students will solve problems, research and analyse issues related to their own well-being and safety. The Physical Education curriculum draws on students’ imagination and ideas to find solutions to

movement situations and challenges. This demands a level of flexibility in thinking. There is a focus on developing skills such as emotional regulation and concepts such as safe traffic behaviour. The emphasis is on playful activities that bring joy and enable experiences of success rather than academic rigour.

Comparative Analysis

The expectations of Year 2 students in the AC: HPE and Grade 2 in Finland have much in common, and consideration of breadth, depth and rigour indicates that the two curricula are on a par with each other at this comparison point. The greatest variation is seen in breadth. Whereas the AC: HPE articulates broad content, for example across 18 threads of content, the FNCC is, on balance, less specific.

Both curricula reflect a broad definition of health beyond the physical and have a focus on working from students' strengths. The AC and the FNCC place an emphasis on social skills, help seeking and keeping themselves safe, healthy, and active. To achieve this, both curricula expect seven-year-olds to develop and use problem-solving strategies. The AC: HPE prioritises questions in Year 1 and 2 such as *What keeps people healthy?* which builds upon individual and community assets (ACARA, 2017j). Similarly, the FNCC expects Grade 2 students to reflect on factors that support health and wellbeing, with consideration of things that bring people happiness and joy (FNBE, 2016).

Physical education is considered a powerful tool in both curricula to learn about respectful interaction, responsibility and emotional regulation. Both the AC: HPE and the FNCC expect students to develop a range of fundamental movement skills through a range of games, rhythmic movement and physical activities. There are, however, some subtle differences. The AC expects seven-year-old students to understand how the body reacts to physical activity whereas the FNCC emphasises using the senses and reinforcing positive experiences while testing the boundaries of psychological functional capacity. Water sports and swimming are also an explicit part of the FNCC Grade 2.

The most significant difference exists in relation to the detail of learning expectations. The AC: HPE articulates understanding personal identities, family and community acknowledgement of change, including others, examining health messages, valuing diversity and incorporating elements of movement. The FNCC is more general apart from explicit expectations around, for example, traffic safety, bullying and food-related education.

Outdoor learning is a strong feature of the Finnish PE curriculum. Seven-year-olds are expected to develop skills in nature and on snow and ice. However, in the AC, Year 2 students are expected to identify and explore natural environments where physical activity can take place. Another significant difference between the FNCC and AC: HPE is the explicit focus on observation and self-assessment in the former.

Therefore, while the learning expectations of Year 2/Grade 2 students in the AC: HPE and FNCC are generally comparable, there are some differences in relation to the relative emphasis placed on some content and the level of detail relating to the development of certain skills.

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: Health and Physical Education (AC: HPE)

Finnish National Core Curriculum: Environmental studies (FNCC: ES)

Physical Education (FNCC: PE) and Transversal competence (FNCC: TC), Taking care of oneself and managing daily life (T3)

Expectations: Knowledge and Skills

The AC: HPE is presented through two interrelated strands: *Personal, social and community health* and *Movement and physical activity*. By the age of eleven, students are expected to have the knowledge, understanding and skills to create opportunities and take action to enhance their own and others' health, wellbeing, safety and physical activity participation. Building on previous learning, they understand the physical and social changes that are occurring for them and examine how the nature of their relationships changes over time. The curriculum expects students to develop skills and understanding about more complex movement patterns and situations through, for example, challenge and adventure activities and sport. They can effectively communicate and problem-solve in groups. Understanding how participation in physical activity can enhance health-related fitness and wellbeing across the lifespan and contribute to intercultural understanding is foundational to future learning. The AC: HPE is distinguished by an expectation that students gain an understanding of the cultural significance of physical activity (ACARA, 2017j).

In Finland, Environmental Studies (ES) is an integrated subject through which content related to relationships and sexuality content (*Me as a human being*) is delivered. The curriculum expects that students will understand their own growth and development, recognise messages of body and mind and be aware of their own thoughts, needs, attitudes and values. By the age of 11, students are expected to recognise, express and regulate their own emotions and promote their own and others' well-being and safety (FNBE, 2016).

The FNCC: PE is organised around 11 physical, social and psychological functional objectives. By the end of Grade 6, students are expected to have diversified and strengthened their fundamental movement skills and enhanced their social skills to take responsibility for shared learning situations. The latter is also an expectation of the T3 curriculum *Taking care of oneself and managing daily life* through which students are expected to understand that everyone influences their own and other people's well-being, health, and safety (FNBE, 2016). Students are expected to assess, maintain and develop their physical fitness, to have developed water rescue skills, and participated in the *planning, development, and responsible execution* of lesson activities, all of which distinguish this curriculum from the AC.

The AC: HPE and the FNCC are comparable and explicit in requiring Year 6 students to develop decision-making skills, promote their own and others' wellbeing and safety, expand their physical competence and begin to focus on fitness, albeit to different depths.

Differences between the two curricula include the way fitness is described as well as a more explicit focus on aesthetics and safe traffic behaviour in the Finnish curriculum.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC			PE/ES/T3			PE/ES/T3		PE/ES/T3	

AC – Breadth

Breadth: Comprehensive

For students in Year 6, the expectations of the AC: HPE are **comprehensive** in relation to breadth of coverage. The curriculum expects teachers to cover 18 content descriptions and 11 focus areas. This content, supported by 63 elaborations, covers an exhaustive range of health and physical activity topics from understanding physical and social changes to group problem-solving and composition of movement. Students are expected to demonstrate a wide range of understanding and skills that will assist them to investigate and take action to improve their own health and that of others, monitor safety and wellbeing and achieve movement outcomes as described in the achievement standard. The AC: HPE also draws upon general capabilities to develop relationship management skills (personal and social capability), apply critical and creative thinking processes, develop intercultural understanding, and demonstrate ethical behaviour (ethical understanding), to further expand the curriculum (ACARA, 2017j).

FNCC – Breadth

Breadth: Comprehensive

In the Grade 6 FNCC, 11 objectives in PE and three HPE-related objectives in Environmental Studies represent a **comprehensive** breadth of learning. Health, safety and human relationships are also covered in the transversal competence: Taking care of oneself and managing daily life (T3). Seven aspects of T3 objectives are emphasised in Grade 6. As a result of these, students are expected to understand positive and negative influences on wellbeing, health and safety (in particular road safety) and learn about privacy and personal boundaries in order to protect themselves. Breadth of the Grade 6 FNCC is enhanced by delivery through three compulsory components of the curriculum (PE, ES and T3) as well as the expectation to learn about food and nutrition through involvement in planning school meals (FNBE, 2016).

AC – Depth

Depth: Challenging

The expectations of the AC: HPE for eleven-year-olds are **challenging**. The depth to which learners may explore a range of complex topics is indicated through content descriptions and further through extensive elaborations that include possible critical inquiry approaches. The curriculum expects students to use higher order thinking in most content descriptions to

plan and enact creative solutions to promote health as well as solve and assess movement challenges. Interconnected learning across HPE sub-strands requires cognitive effort to transfer thinking and learning from one context to another (ACARA, 2017j).

FNCC – Depth

Depth: Challenging

On balance, the expectations of the Grade 6 FNCC in relation to depth are **challenging** when learning objectives are considered across the three components of PE, ES and T3. Most ES objectives involve describing key concepts associated with wellbeing and safety, demonstrating skills, acting responsibly, recognising and expressing emotions and applying health literacy and respectful and safe practices in different situations and communities. PE objectives expect eleven-year-olds to demonstrate collaboration, take responsibility for shared learning, improve and apply a diversity of movement skills in different learning environments as well as assess and develop physical fitness. Additional cognitive effort is required for students to find solutions in movement situations and participate in planning learning activities as part of the PE curriculum. Taking responsibility for self as well as the operation of the learning environment is also an expectation of T3.

AC – Rigour

Rigour: Moderate

The terminology and expectations of the AC: HPE (Year 6), expressed through the content descriptions, are predominantly associated with the development of skills and concepts (as per Webb's DoK, 1997), indicating a **moderate** degree of rigour. The cognitive demand placed on Year 6 students in the HPE curriculum content requires them to develop skills and understanding through investigating, planning, examining, exploring, negotiating, and applying critical and creative thinking in movement and health contexts. Elaborations reinforce multiple approaches and provide further support to stretch students' cognitive capacity. The expected learning also demands that students use flexible thinking, use conceptual knowledge, and apply solutions to real-life issues beyond the classroom. The Year 6 achievement standard for HPE requires the application of conceptual knowledge to make judgements or collaboratively and creatively solve a problem.

FNCC – Rigour

Rigour: Moderate

The FNCC predominantly centres on the development of skills and concepts, indicating a **moderate** degree of rigour. The cognitive demand placed on Grade 6 students involves development of the skills to recognise, rehearse, develop, demonstrate, promote, apply, and practise skills, impacts and solutions related to healthy, safe and active living. Some requirements suggest more complex thinking and invite reasoning and demand collaborative skills to apply solutions to real-world problems. Students are provided with opportunity to enact complex thinking when they contribute to the effective functioning of the classroom.

Comparative Analysis

At this comparison point, the AC: HPE and the FNCC provide comparable rigour. However, evidence from achievement standards and content descriptions suggests that there is greater depth and breadth in the AC: HPE.

Both curricula expect eleven-year-olds to take responsibility for their actions, and work effectively, respectfully and inclusively with others. The two curricula reveal similarities in the flexibility of content used by teachers to account for shifting local patterns of influences, needs, interests and priorities in health and physical activity. This strengths-based approach focuses on recognising, valuing and harnessing individual and community resources to positively influence health, safety and active living of 11-year-olds. National assessment criteria are used to determine the achievement level for 6th Grade school year reports in the same way that Year 6 achievement standards are used to determine achievement in relation to the AC: HPE. In Finland, criteria are predominantly based on physical skills.

By the end of Year/Grade 6, both curricula expect students to have developed conceptions of gender identity and sexuality. This content is in line with the OECD recommendations about inclusive sexuality education (UNESCO, 2009).

Unlike the AC, the FNCC uses the term *health literacy* in Grade 6 learning objectives. *Health literacy* is embedded as an underpinning proposition in the AC: HPE and is assuming a growing focus of research. One leading approach to adolescent health literacy suggests that if pedagogy is embedded in the ethos of the school and implemented effectively across learning areas and throughout the school day, resulting learning opportunities will promote deep thinking, critical thought and understanding essential for capable health-literate adolescents (Peralta, Rowling, Samdal, Hipkins, & Dudley, 2017).

Both curricula value the concept of movement that involves knowledge, understanding, skills and dispositions, leading to competence, confidence, and positive health outcomes (ACARA, 2012b; FNBE, 2016). Both curricula expect students to develop skills that protect and promote physical, social and emotional health and safety and provide students with opportunities to practise health enhancing behaviours (Centre For Disease Control, 2013). However, topics are more detailed in the AC: HPE. Australian students explore outdoor activities that support health and create connectedness whereas, in comparison, the FNCC has less of a focus on relating outdoor activity to health and wellbeing benefits. Finnish students are expected to simply become skilled in outdoor sports and physical activities. Links to wellbeing are implicit.

Other points of difference are apparent. Finland's PE objectives detail the expectation of *positive experiences of their own body, self-efficacy and togetherness*. Experience of aesthetics is expected and demonstrated by the words *joy* and *positive emotions* in the PE curriculum documents. Students are expected to reflect on these aesthetic experiences but this reflection is not included in the final grade at the end of Grade 6.

Eleven-year-old students are expected to demonstrate safe traffic behaviour. In the AC: HPE, safety in road and other transport environments is described in the Safety focus area as one of the safety issues that students may encounter in their daily lives. In the FNCC, attention is paid to students' cycling skills and their independent mobility beyond the school

where they are expected to ensure their own and other people's safety on the road. Cycling is optional in the AC: HPE.

There are significant differences between the Finland and Australia curricula in terms of the way fitness is described in the curriculum. Finnish students are expected to assess their own physical functional capacity and use fitness technology. Prior to Grade 6, fitness results are not used as the basis for assessment; students are guided to self-assess their own level of fitness. A national monitoring system for physical function capacity called Move! provides national assessment criteria which are used to determine achievement for the 6th Grade report. Move! has been developed for schools as a tool to produce objective information on the physical functional capacity of children (Dimenteq, August 2017). Move! includes eight measurement sections that measure pupils' endurance, strength, speed, mobility, balance, and basic motor skills. The information is used for example in school health care. The AC: HPE does not introduce the concept of fitness until Years 5 and 6. Eleven-year-olds' fitness levels are not reported on. Rather, students are expected to be able to describe features of health-related fitness and its relationship to health and wellbeing.

In both curricula, students are expected to have mastered basic skills that are important in participating in physical activity. In Finland, the focus is on shared activities (FNBE, 2016) and the development of skills through *versatile* forms of exercise on ice, snow, in nature, and music and dance exercise (FNBE, 2016, p. 339). Students are expected to have an understanding about bullying by the end of Grade 6; it is no longer part of the PE curriculum in the secondary years. On the other hand, the AC: HPE features bullying as part of the *Interacting with others* content descriptions beyond Year 6.

As a result of this comparative exercise, successful 11-year-olds in Australia and Finland relate to their peers and the world around them. They understand the physical, social and emotional changes that are happening for them, and how to promote health and safety. Students understand how to cope with puberty, establish and manage respectful relationships and know how to keep themselves safe. At this level, students have developed the knowledge, skills and mindsets to successfully participate in a wide range of physical activities including a variety of games, sports and outdoor activities. They have developed the skills and knowledge to make healthy lifestyle choices, both in and out of school, including healthy eating and daily physical activity. The OECD acknowledges the holistic and important nature of such learning (OECD, 2017c).

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: Health and Physical Education (AC: HPE)

Finnish National Core Curriculum: Health Education (FNCC: HE)

Physical education (FNCC: PE) and Transversal Competence (FNCC: TC), Taking care of oneself and managing daily life (T3)

Expectations: Knowledge and Skills

The AC: HPE is articulated through two interrelated strands of *Personal, social and community health* and *Movement and physical activity*. The curriculum expects students, by the age of fifteen, to be able to critically analyse health and physical activity information in order to apply and refine strategies that build and optimise personal and community health and wellbeing and improve their own and others' performance. In Year 10, students apply more specialised movement skills and complex movement strategies and concepts in different movement environments. The curriculum also provides opportunities for students to refine and consolidate personal and social skills in demonstrating leadership, teamwork and collaboration in a range of physical activities. The AC: HPE is distinguished by an expectation that students can analyse how participation in physical activity and sport influences an individual's identity and explore the role such participation plays in shaping cultures.

Similar learning is provided in Finland through FNCC: HE, FNCC: PE and the Transversal Competence, *Taking care of oneself and managing daily life* (T3). In Grades 1-6, health education is taught as a part of Environmental Studies. Health education in Grades 7-9 was originally delivered through Physical Education. It was introduced as a new, separate subject in 2014 and expands themes studied in lower grades of schooling. Fifteen-year-olds are expected to be competent in promoting health, safety and wellbeing and demonstrate critical thinking, self-awareness and ethical reflection. Objectives of health education link strongly with the AC General Capabilities: Personal and social capability in terms of emotional regulation, understanding self as a learner. Students are expected to become adept at a range of physical skills and understand how this increases confidence, encourages lifelong participation in physical activities and leads to overall health. Health literacy is prescribed at this level and in earlier years and fifteen-year-olds are expected to participate in planning Grade 9 lessons and managing the learning environment, reflecting a focus on student engagement and involvement. These are distinctive features of Grade 9 learning as opposed to what is seen in the AC.

The AC: HPE and the FNCC are comparable in requiring fifteen-year-olds to develop a holistic understanding of health. Students are expected to access and apply health information in order to make responsible and informed health-related decisions. Both curricula expect fifteen-year-olds to apply their learning to their own and others' lives. HPE is not compulsory beyond Year 10 in Australia however in Finland both Health Education and Physical Education exist as compulsory courses for upper secondary students (FNBE, 2015).

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC			HE/PE/T3			HE/PE/T3			HE/PE/T3

AC – Breadth

Breadth: Comprehensive

For students in Year 10, breadth of content coverage in the AC: HPE is assessed as **comprehensive**. The curriculum expects teachers to cover 18 content descriptions and 10 focus areas over Years 9 and 10. This content, supported by 76 elaborations, covers an exhaustive range of health and physical activity topics from empathy, ethical decision making, and considering diverse communities to personalised fitness plans. Students are expected to demonstrate a wide range of understandings and skills that will enable them to apply informed decision-making when taking action to enhance their own health and that of others, and to consider safety, wellbeing and movement as described in the achievement standard.

FNCC – Breadth

Breadth: Comprehensive

The breadth of the equivalent area in the FNCC is assessed as **comprehensive**. Students in Grade 9 are expected to achieve 13 objectives in PE, 12 objectives in health education. Health topics include: local and global promotion of health and prevention of illness, identity, diversity of sexual development, sexual health, mental wellbeing, safety, emotions, conflict, stress and crisis management, sleep, nutrition, and exercise. PE topics include application of fundamental movement skills including play, water sports, water rescue and swimming, fitness. Breadth of the Grade 9 FNCC is enhanced by delivery through three compulsory components of the curriculum (PE, HE and T3) as well as the expectation to learn about food and nutrition through active involvement in planning and evaluating school meals.

AC – Depth

Depth: Challenging

Based on consideration of content coverage, the expectations of the AC: HPE are deemed to be **challenging**. Students are expected to use strategic and extended thinking governed by the Year 10 content descriptions. Specifically, students are expected to evaluate emotional situations, critically analyse health information, examine the impact of transitions on relationships, evaluate decision making, critique contextual factors, and transfer understanding from one context to others. This learning places significant cognitive demand on students and requires teachers to create rich environments for students to successfully complete such tasks. The curriculum provides opportunities for connecting learning between strands, sub strands and threads. Students are expected to transfer learning between physical and health-related issues in order to synthesise their learning.

FNCC – Depth

Depth: Challenging

On balance, the expectations of the FNCC in relation to depth are **challenging**. Although many Grade 9 objectives are the same as, or similar to, those in Grade 6, some Grade 9 objectives build on those in Grade 6, such as evaluating levels of fitness, swimming, performing rescues and behaving in safe and appropriate ways beyond the PE classroom. Fifteen-year-olds are expected to apply their developing movement skills in diverse situations, find forms of recreation that bring joy and understand holistic wellbeing. Grade 7-

9 Health is described as multi-dimensional and multi-level (FNBE, 2016, p. 477) which suggests deeper levels of learning. Health education expects students to grasp extensive themes, develop knowledge, skills, self-awareness, critical thinking, and ethical responsibility related to health. Fifteen-year-olds are expected to examine causes of, and connections between, factors that support and harm health for individuals, family, society and globally through authentic situations and environments. Recognition and regulation of emotions remains an expectation for Grade 9 students as it is for those in Grade 6.

AC – Rigour

Rigour: Challenging

The terminology and expectations of the AC: HPE content descriptions are associated with a **challenging** degree of rigour. The cognitive demand placed on Year 10 students is high; they have to develop skills and understandings to evaluate, critically analyse, examine, propose, investigate, critique, analyse, refine, reflect and transfer understanding from one context to others. The AC: HPE expects that Year 10 students apply self-generated solutions to complex real-world issues; for example, students are expected to plan and evaluate new and creative interventions that promote their own and others' connection to community and natural and built environments. The curriculum requires that students uncover and select relevant and credible supporting evidence for their analyses, judgements, and solutions. The breadth and depth of curriculum content in the AC: HPE sustain inquiry into personally and socially relevant issues and topics. Further examples of the curriculum's capacity for rigour are provided through an extensive set of elaborations such as critiquing media representations of diverse peoples and analysing what makes (or could make) the representations inclusive. The Year 10 achievement standard for HPE uses language such as *critically analyse, synthesise, justify, design* and *refine* (ACARA, 2017j).

FNCC – Rigour

Rigour: Challenging

On balance, the delivery of health and physical education through HE, PE and T3 indicates a **challenging** degree of rigour. In Grade 9 T3, students are expected to manage conflicting emotions, recognise wellbeing factors, develop skills and act appropriately. This places considerable demand on students' ability to use judgement and apply solutions to real world issues. Grade 9 PE demands application of problem-solving skills, expects students to evaluate their own social skills and take responsibility for group function and assessment. Individual and group persistence is expected. Most health education objectives also demand intellectual challenge, as seen in the statement that "the instruction strives for more accurate use of concepts specific to the field of knowledge and reinforces competence related to age-appropriate critical thinking, self-awareness and ethical reflection" (FNBE, 2016, p. 477). Students are expected to find responsible solutions which consider individual, communal and equity factors, apply concepts of physical, mental, and social health, evaluate and justify choices, evaluate reliability and significance of information, critically examine values and norms, analyse rights and responsibilities and critically evaluate communication (FNBE, 2016, p. 478). They are expected to express their own knowledge and experiences, ask questions and search for answers, structure information as well as to draw conclusions and make arguments for them.

Comparative Analysis

On balance, the AC: HPE and the FNCC provide comparable breadth, depth and rigour at this comparison point. There are similarities in the cognitive demand placed on students in both curricula. The AC: HPE requires students to critically analyse and apply health information to decisions. Similarly, the FNCC Grade 9 expects students to critically evaluate health and illness information.

In both jurisdictions, the study both of physical education and health education is designed to provide immediate and lifelong benefits (Graham, 1998). Both curricula also require students to understand the importance of staying physically active throughout life and participating in a wide range of activities. The AC: HPE implicitly and the FNCC explicitly expect students to use technology to make and track personal fitness plans as well as display team work in a variety of physical activities.

The premise of health education in Finland is based on compliance with human rights and topics are dealt with through a phenomenon-based/inter-disciplinary method (Zhukov, 2015). Instruction is planned to enable connection between other subjects as well as school health care to allow students to apply their learning as part of the whole school culture. Observing and analysing real-life scenarios is also a feature of the AC: HPE. Although inter-disciplinary methodology in Australian schools is at the discretion of individual schools, resources have been developed to illustrate opportunities for AC content to be delivered in connected and cohesive ways across learning areas, general capabilities and cross-curriculum priorities, for example, the AC Connection Outdoor learning.

Both the AC: HPE and the FNCC: PE focus on “health literacy” (Nutbeam, 2006). This is described in the AC: HPE as a personal and community asset to be developed, evaluated, enriched and communicated as one of the five underpinning propositions in the AC: HPE. Year 10 AC: HPE students are expected to develop knowledge and understanding of and skills in all three dimensions of health literacy: functional, interactive, and critical. The Finnish curriculum has a strong focus on health literacy throughout the Grade 9 health education curriculum. Both curricula require students to investigate the role of preventative health on individuals, families and communities to contribute to, but not necessarily to solve, society’s health and wellbeing issues (ACARA, 2012b). Both curricula also promote the concept of communal wellbeing across the entire school community (FNBE, 2016, p. 479). The AC: HPE places importance on a healthy school environment to validate and reinforce HPE learning.

In the FNCC: PE introduction, the *task of the subject* details that PE promotes *equity, equality, and togetherness* and supports *cultural diversity*. The Grade 9 PE curriculum identifies “an encouraging and accepting atmosphere as a prerequisite” for achieving learning objectives. Objectives are written to the teacher and there is explicit direction to use pupil-centred and participatory teaching, learning and assessment methods. As in other comparison points, a distinguishing factor of the FNCC is a focus on self and peer assessment with an emphasis on verbal assessment tasks that are not comparative between students. The equitable approach is seen in the statement that “It is particularly important in health education to ensure that the assessment is not targeted at the pupil’s values, attitudes, health behaviour, sociability, temperament, or other personal characteristics” (FNBE, 2016, p. 480).

The focus of assessment in Grade 9 is “to support learning and to encourage the pupils to develop their health literacy and to apply it in practice” (FNBE, 2016, p. 562). The focus is on how the student reflects on and justifies his/her views and decisions. Understanding equality and the significance of culture are objectives of the FNCC: HE. Similarly, the AC: HPE has a thread of content descriptions about valuing diversity.

The PE curriculum demands *plenty of physical activity*. The national monitoring system for physical functioning capacity, Measurements of the Move! National, is used for Grade 9 students. This testing supports the extended health examinations undertaken in Grade 8. There are no comparable measures in relation to HPE in Australia.

Both curricula expect students to plan and practise health promoting strategies. T3 articulates “the importance of sleep and rest, a balanced daily rhythm, exercise and versatile nutrition, and the significance of an intoxicant-free lifestyle and good manners in life” as part of T3 (FNBE, 2016, p. 349). T3 expects students to be able to anticipate and avoid dangerous situations, act responsibly, use safety equipment and not drive intoxicated. The AC: HPE expects fifteen-year-olds to “synthesise and apply health information from credible sources to propose and justify responses to health situations” (Year 9-10 achievement standard).

Both curricula expect students learning at this level to understand the significance of physical activity in promoting health, design and evaluate fitness plans and make decisions about life-long physical activity. Neither curriculum expects reporting of students’ levels of fitness. FNCC expects fifteen-year-olds to demonstrate self-efficacy and a positive self-image. This is developed through *joyful experience* and *positive emotion*. These concepts and outcomes are implicit in the AC: HPE.

At this comparison point, students in both jurisdictions can question what they see and hear, apply health information and take action to improve their health and wellbeing. They both emphasise the health, safety, wellbeing and physical activity of others and the community, as well as self. Both curricula explicitly mention water safety. The AC: HPE explicitly requires that Year 10 students become skilled at cardiopulmonary resuscitation (CPR). The FNCC requires that Grade 9 students can perform water rescues and first aid.

Additional Observations

Because unhealthy eating habits, limited access to healthy food and lack of physical activity are now driving Finland’s childhood obesity epidemic, the country is using schools to improve the health of their pupils (World Health Organisation (WHO), 2015). Following the Finnish National Nutrition Council dietary guidelines, schools must provide free, healthy lunches to every student. National policies also require that schools provide obligatory health education classes, physical education and nutrition and cooking lessons. Although healthy eating and healthy canteens are promoted in Australia and food and nutrition is one of the AC: HPE focus areas, there is no comparable policy across schools.

Curriculum design

Both the Australian and Finnish curricula offer flexibility to teachers in the way they organise learning. The choice of formats is based on the individual student, teacher, school and community contexts. While Australia’s curriculum was written with the notional timetabling of

approximately two hours per week, the Finnish time allocation for health education and physical education is decided locally as Finland puts significant trust in its teachers to facilitate the curriculum. Another similarity is that both curricula describe learning by bands; two year bands of learning from Year 1 to 10 in the AC: HPE and two and four year bands in the FNCC.

Connections across learning areas

The FNCC demands integrated learning at least once per year (FNBE, 2016). In the AC there are also opportunities to connect learning in HPE with other learning areas (ACARA, 2017j). Examples of this for Years 2, 6 and 10 are provided via the Curriculum Connections resources of Food and wellbeing and Outdoor learning. In these resources, authentic and meaningful connections are made between HPE, Design and Technologies, Science, Humanities and Social Sciences and Mathematics.

Physical literacy

Physical literacy features explicitly in the Finnish curriculum. It is not explicitly mentioned in the AC: HPE. However, student acquisition of knowledge, skills and dispositions that enable them to participate successfully in a wide range of physical activities can be found throughout the three Movement and Physical Activity sub strands in the AC: HPE. Internationally, there is still some debate about the meaning and value of the term “physical literacy” in schools (Corbin, 2016).

Whole child approaches

Both curricula describe the importance of advocacy for the safety, health and wellbeing of others and are designed to provide lifelong benefits. Personal wellbeing and healthy habits are seen as important outcomes and thereby reinforce the need for quality physical education and health education as part of a ‘complete’ education. Similarly, the OECD promotes developing the whole child (OECD, 2015c).

g) Languages

Comparative Curricula

Australian Curriculum: Languages

Version 8.3, 2016

Finnish National Core Curriculum: Foreign Languages

Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grades 3-6

Learning Area/Subject

Australian Curriculum: Languages (AC: L), (Italian)

Finnish National Core Curriculum: Foreign Languages (FNCC: FL), (English)

Expectations: Knowledge and Skills

The AC: L includes fourteen foreign language-specific curricula and two frameworks - a Framework for Aboriginal Languages and Torres Strait Islander Languages and a Framework for Classical Languages with language-specific curricula for Classical Greek and Latin. In the AC: L there are two sequences of learning, one from Foundation to Year 10 and one from Year 7 to 10. First, second, and background learner pathways have been developed for use with language learners who possess varying levels of knowledge and skill in some languages such as Chinese, Auslan and the Framework for Aboriginal Languages and Torres Strait Islander Languages. Notably, the framework also has a Language Revival Learner Pathway.

The curriculum for all languages and above frameworks is structured around two interrelated strands *Communicating* and *Understanding*, with the same sub-strands of *socialising, informing, creating, translating, reflecting, systems of language, language variation and change* and *role of language and culture* in both sequences and all pathways. In the AC: L, learning is described in bands of years (F-2, 3-4, 5-6, 7-8, 9-10 and 7-8 and 9-10 (Year 7 Entry). As the Year 6 (F-10) and Year 10 (Year 7 Entry) content is described in bands, the curriculum does not make explicit the developmental sequence of learning from Foundation and from Year 7 (Year 7 Entry). The structure of the AC: L consists of the Content Descriptions, Elaborations and Achievement Standards and applies across all the languages. The General Capabilities - *Literacy, Numeracy, Information and Communication Technology (ICT) Capability, Critical and Creative Thinking, Personal and Social Capability, Ethical Understanding and Intercultural Understanding* and the Cross-Curriculum Priorities - *Aboriginal and Torres Strait Islander Histories and Cultures, Asia and Australia's Engagement with Asia* and *Sustainability* are imbedded in the Content Descriptions of the curriculum.

The FNCC: FL provides opportunity to study several foreign languages, for example English, French, German, Italian, Latin, Russian and Spanish. Recognising English as the most popular foreign language in Finland, the FNCC contains an English language syllabus. In the FNCC, learning is described in Grade groups of two and three across nine years – Grades 1-2, Grades 3-6 and Grades 7-9 with the study of foreign languages commencing in Grade

3. The same structures of the FNCC: FL apply across Mother Tongue Languages and National Languages: Objectives of Instruction, Key content areas related to the objectives, Transversal Competences, and Assessment criteria for verbal assessment describing good knowledge and skills.

The Objectives of Instruction are addressed to guide teachers on what students should be able to do and the Key content areas related to the objectives inform teachers on how to facilitate learning. The Transversal Competences include the sub-categories of Thinking and learning to learn, Cultural competence, interaction and self-expression, Taking care of oneself and Managing daily life, Multiliteracy, ICT competence, Working life competence and Entrepreneurship and Participation, involvement and building a sustainable future. The competences are explicitly aligned to the syllabus and interconnected with the Objectives of Instruction and the Contents areas related to the objectives (FNBE, 2016, p. 277).

Both the AC and the FNCC include a number and range of foreign languages as subjects within a Languages area of learning. Both base their design on frameworks that exhibit a high level of commonality across languages. For the purposes of comparison, this comparative study considers AC: Italian and FNCC: English as a representative sample. At the end of Year 6 (AC), students will have completed seven years of study of Italian as a second language. At the end of Grade 6 (FNCC), students will have completed four years of study of English as a foreign language.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 6, the expectations of the AC: L are considered to be **comprehensive** in terms of content coverage.

Within the Communication strand, each sub-strand includes a number of threads of content descriptions, each of which provides elaborations as examples of how the content might be interpreted in the classroom. Also included are key concepts and key processes, as well as text types in the *creating* sub-strand. The elaborations, key concepts (KCs), key processes (KPs) and text types vary considerably in nature and number in each of the sequences.

Learning the language in order to communicate with others and learning how language works as a system are both strategies that are integrated with the aim of understanding the cultural context of language. Students are expected to develop their knowledge and skills in the language within appropriate topics that begin with the local and familiar (family, friends, home, routine, lifestyle) and expand to broader conceptual contexts (society, environment, wellbeing, fact, giving reasons, drawing conclusions, opinion).

Table 3. 24 Number of content descriptions in AC: L, Year 6 (Communicating)

Communicating Strand	Year 6 (F-10)			
Sub-strand	CDs	Elaborations	KCs	KPs
Socialising	4	21	8	9
Informing	2	8	4	6
Creating	2	7	5 and 5 text types	5
Translating	2	6	4	3
Reflecting	2	6	2	4
Total	12	48	28	27

Table 3. 25 Number of content descriptions in AC: L, Year 6, (Understanding)

Understanding Strand	Year 6 (F-10)	
Sub-strand	CDs	Elaborations
Systems of language	3	17
Language variation and change	3	9
Role of language and culture	1	3
Total	7	29

FNCC – Breadth

Breadth: Comprehensive

The FNCC's *English as a foreign language* syllabus is **comprehensive** in relation to content coverage. During Grades 3-6, pupils are exposed to the language of instruction and at least two other languages with an option of a fourth language. Students become familiar with and build on the skills of all elements of language learning. The content of the syllabus is delineated by the Transversal Competences which act as drivers of knowledge and skills, and emphasise how they might be applied in the appropriate context. Language learning is embedded in the FNCC, explained as follows: "Language is a prerequisite for learning and thinking....it provides material for the formation and appreciation of a plurilingual and multicultural identity.....at school, studies in the first foreign language...usually start in third Grade. However, instruction may begin before the third Grade" (FNBE, 2016, p. 172). Students are exposed to at least two languages from preschool through Grades 1 and 2 where learning takes place in the Mother Tongue and the First National Language. In Grades 3-6, "Teaching and learning strengthens and complements the basic knowledge and skills obtained in the earlier Grades and supports the learning of new ones" (FNBE, 2016, p. 203). There is a transition phase between Grades 2 and 3 and the task of Grades 3-6.

The Grade 6 *English as a foreign language* syllabus represents four years of learning a foreign language and ensures a developmental sequence of learning. Table 3.26 shows the structure of learning of the FNCC: English as a Foreign Language for Grades 3-6:

Table 3. 26 Coverage of FNCC: English as a Foreign Language, Grade 3-6

Objectives of instruction	Objective breakdown (sub-strands)	Content areas related to the objectives	Transversal competences
Objective: Growing into cultural diversity and language awareness	4	Content area 1	T1, T2, T3
Objective: Language-learning skills	2	Content area 2	T1, T3, T4, T5, T6
Objective: Evolving language proficiency, interaction skills	3	Content area 3	T2, T4, T5, T7
Objective: Evolving language proficiency, text interpretation skills	1	Content area 3	T4
Objective: Evolving language proficiency, text production skills	1	Content area 3	T3, T4, T5, T7

AC – Depth

Depth: Challenging

The expectations of the AC: L, Italian Year 6 (F–10) are deemed to be **challenging**. The focus at this stage is on building interactional skills, maintaining and contributing conversations, expressing ideas, points of view and preferences using appropriate language for a range of purposes. Learners are engaging with and creating a variety of texts such as emails, blogs and dialogues and reflecting on the use of language. They are able to manipulate the language appropriately in unfamiliar contexts. They are recognising verbal and non-verbal cues and increasing their range of Italian vocabulary, grammar and tenses and using adverbs, adjectives, and prepositions to create more complex sentences. Students are becoming more independent but still require support from teacher scaffolding and modelling. They are expected to demonstrate a deeper understanding of the differences and similarities in the cultural practices of Italians and Australians.

Students are also expected to use higher-order skills and deep thinking to *modify (ACLIT048), interpret (ACLIT052), reflect (ACLITC040), (ACLIT049), review (ACLIT045), synthesise (ACLITC043), and understand the diversity of languages and cultures represented in the classroom and the multilingual and multicultural character of the Australian society (ACLIT055) and reflect on their own assumptions about the values, beliefs and cultural norms of Italians compared to their own (ACLITU057)* ACARA, 2017k).

FNCC – Depth

Depth: Challenging

The expectations of the FNCC at Grade 6 are rated as **challenging**. Students are expected *to notice, to value, to understand, to explore, to take responsibility, to practise interacting, to work with spoken and written texts, to pay attention to essential structures and the basic rules of pronunciation, make observations on the differences and similarities related to structures, vocabulary*. Higher-order skills are instanced in the assessment criteria, where students are encouraged to reflect on their experience of learning and greater cognitive demand placed on the learner to be able to “*describe the study goals and to set goals for his or her language learning and assesses his or her skills*” (FNBE, 2016).

The FNCC's Transversal Competences actualise the curriculum, enabling learners to achieve deeper thinking and acquire the depth of the skills, capabilities, knowledge and proficiency set out in the Objectives of Instruction and Content areas.

AC – Rigour

Rigour: Challenging

The AC: Italian, Year 6 content develops skills and understanding through a range of key processes: comparing, connecting, corresponding, creating, exchanging, explaining, identifying, informing, interpreting, making decisions, modifying, participating, performing, planning, recognising, reflecting, researching, reviewing, selecting, sharing, synthesising, understanding, taking action, transacting, translating, Together, these expectations indicate a **challenging** degree of rigour (ACARA, 2017k).

Students are given multiple opportunities to apply capabilities, strategies and knowledge to a range of contexts. The elaborations give clear direction to teachers on how to provide learning experiences that are challenging and allow students to engage with Italian in a deeper and broader way.

Year 6 constitutes the seventh year of learning another language, and the AC recognises that students build on language learning strategies and intercultural awareness to the experience of learning Italian. Students' textual knowledge developed through English literacy learning also supports further development of literacy in Italian, as found in the statement that “Students are expanding their social networks, experiences and communicative repertoires both in their first language and Italian”. The expectation is that students will develop skills of “reflecting, reading language for cultural and contextual meaning, selecting appropriate language and creating texts to engage particular audiences, develop metalanguage to describe rules and variations in language structures and consider how language features and expressions reflect cultural and experiences” (AC: Years 5 and 6 Band Descriptions). The elaborations provide suggestions for teacher action that encourage multiple approaches, strategies and solutions to help facilitate students' deeper and broader engagement with learning Italian (ACARA, 2017k).

FNCC – Rigour

Rigour: Challenging

The FNCC: English as a Foreign Language, Grade 6, develops skills, understanding and knowledge that indicate a **challenging** degree of rigour (FNBE, 2016). Cognitive demands include mastering the elements of language learning – listening, speaking, reading and writing – and becoming aware of cultural diversity and the changing nature of language in a range of contexts. Rigour is encouraged and achieved through a scaffolding approach to the learning experience. The teacher is perceived less as the conveyor of content, knowledge and skills and more as the facilitator of the learning experience. This is evident in the Objectives of Instruction where, for example, the teacher is expected to “guide the pupil to notice, to motivate the pupil to value, to guide the pupil to understand, to guide the pupil to take responsibility, to encourage the pupil to practise and to experiment to find the ways of learning languages that are the best for him or for her, to guide the pupil to practise interacting and to support cultural appropriateness”.

Content areas are very general and give little or no indication of the grammar, language systems, vocabulary, types of questions, verb conjugation, tense and idiomatic language to be taught.

Nevertheless, the Objective for Instruction that includes *Evolving language proficiency, interaction skills, text interpretations, and text production skills* requires students to gain a deeper understanding of, and reflect on the use of, language and register appropriate to time, place, context and audience. Similarly, the Objective of Instruction that refers to *Growing into cultural diversity and language awareness* implies students will need to evaluate and analyse the dynamic nature of English and its role in a global world.

The Objectives of Instruction are pedagogical guidance for teachers. Key content areas provide examples of ways that teachers can engage students in deep learning and higher order thinking. The Assessment targets in the Assessment criteria reflect Finland's national goals for basic education of *knowledge, skills, values, attitudes and will*. The Transversal Competences are integral to the syllabus and have the capacity to boost rigour. For example, Objectives of Instruction 13 and 15 are aligned to Transversal competences one, two, four and two, four, six seven respectively (FNBE, 2016, p. 215).

Comparative Analysis

In the AC: L, Italian Year 6 (F-10), students have completed seven years of study of the language and are 11 years of age. They have learnt the mechanics of writing, the relationship between sounds and pronunciation, aspects of language systems of Italian, rhythm and intonation, Italian phonemes, letter patterns, spelling, grammar and punctuation, and have become literate in the language of instruction in Australian schools, English (ACARA, 2017k).

Through FNCC: Languages, English as a Foreign Language, Grade 6, students have completed four years of studying the language and are 12 years old. They have learned the

systems of language of English and are expected to apply the skills acquired during six years of schooling (FNBE, 2016).

It is assumed that Finnish students are already literate in their Mother Tongue at Grade 3 when they commence the study of English as a foreign language. Finnish students will have gained skills in acquiring the elements of language learning by being exposed to at least two languages in Pre-primary and Grades 1 and 2 – the language of instruction, the Mother tongue and the First or Second National language, Finnish or Swedish. Conversely, students of the AC: L begin the study of a secondary language concurrently with becoming literate in the language of instruction, English.

The demands of both curricula represent the capacity for deep thinking, reflection, analysis, and evaluation. The level of cognitive understanding mastered and the possibility of deeper thinking about language acquisition is likely to be well developed by the end of Grade 6.

A more detailed comparative analysis is offered at the end of AC: Italian, Year 10 and FNCC: English, Grade 9.

Additional Observations

The AC and FNCC have much in common in relation to the skills, knowledge and understanding needed to establish sound foundations in learning in the early years of language acquisition. However, a comparative analysis of the two curricula is made difficult due to the lack of alignment with entry points of commencement of study and age of students. In the AC, students begin the study of a second language aged 5 in Foundation whilst, in the FNCC, students commence the study of English as a foreign language in Grade 3 at the age of 9.

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grades 7-9

Learning Area/Subject

Australian Curriculum: Languages (AC: L), (Italian)

Finnish National Core Curriculum: Foreign Languages (FNCC: FL), (English)

Expectations: Knowledge and Skills

The AC: L expects students of Italian to develop specific skills, knowledge and understanding essential to learning a language in order to communicate with others and understand how the language is constructed. The underpinning philosophy is that learning Italian is integrated with a growing appreciation of the cultural context of the language, the communities in which Italian is spoken and their place in the world. Building on earlier skills acquired from Foundation – Year 9, students of Italian acquire a range of strategies that can be applied to communicate effectively, acquire knowledge of systems of language and conventions of use, and understand the relationship of language and culture. Year 10 students of Italian continue to develop proficiency in the skills essential to listening, speaking, reading, writing and interacting in a second language. Students develop their skills and knowledge within appropriate topics using a range of texts. The AC: L expects Year 10

Italian students to learn to interpret, create, evaluate and analyse a range of genres of texts. The General Capabilities are carried across from F-6 to Year 7-10 (ACARA, 2017k).

For Grade 9 students in Finland, the content, skills and knowledge of *English as a foreign language* are developed incrementally and conceptually since Grade 3, ensuring an effective developmental sequence of learning. This is evident in the *Assessment targets in the language* of the final assessment criteria and the level of proficiency expected (FNBE, 2016, p. 425). The proficiency level is based on the Common European Framework of Reference for Languages (Council of Europe, 2001) which describes what a learner is supposed to be able to do in reading, listening, speaking and writing.

The seven Transversal Competences which underpin all learning areas in the FNCC are aligned to the language-specific Objectives of Instruction and Content areas (FNBE, 2016, p. 423), and students are expected to have acquired language-learning strategies for effective communication. Grade 10 students of *English as a foreign language* are expected to “reflect on the relationship between language and culture of the English language” and appreciate that the English language (like all languages) changes according to community, place, time and audience. They are also expected to take responsibility for their own learning using the European Language Portfolio in Self-assessment (Council of Europe, 2011).

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

For students in Year 10, the expectations of the AC: L, Italian, Year 10 (F-10) are **comprehensive** in relation to breadth of coverage. The AC: L comprises two inter-related strands *Communicating* and *Understanding*, each with sub-strands and a total of 19 content descriptions. The content focuses on the skills of communicating in Italian, and an understanding of the systems of the language, conventions of its use and the culture of the Italian language and Italian speaking communities. In the *Communicating* strand, there are 12 content descriptions under the sub-strands of *socialising, informing, creating, translating* and *reflecting*. Key concepts and processes are identified for each content description. In the *Understanding* strand, there are seven content descriptions in the sub-strands of *systems of language, language variation and change, and language and culture*. The content descriptions reflect the key ideas that developing the knowledge, understanding and skills to communicate effectively and the awareness of the relationship of language and culture shape learning. Students are expected to demonstrate proficiency in the skills and content as described in the achievement standard.

Table 3. 27 Number of content descriptions in AC: L, Year 10 (Communicating)

Communicating Strand	Year 10 (F-10)			
Sub-strand	CDs	Elaborations	KCs	KPs
Socialising	4	18	9	13
Informing	2	9	6	8
Creating	2	9	5 and 6 text types	5
Translating	2	6	6	4
Reflecting	2	10	8	3
Total	12	52	40	33

Table 3. 28 Number of content descriptions in AC: L, Year 10 (Understanding)

Understanding Strand	Year (6-10)	
Sub-strand	CDs	Elaborations
Systems of language	3	12
Language variation and change	3	13
Role of language and culture	1	5
Total	7	30

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 9, the expectations of the FNCC's syllabus in Foreign languages: English are **comprehensive**. FNCC Foreign languages content builds upon the content, knowledge and skills for Grades 3-6 and uses the same structures to ensure a developmental sequence of learning. There are five Objectives of Instruction with a total of 10 sub-objectives, three Content descriptions and the same Transversal competences as in previous Grades. The assessment criteria further define the knowledge and skills required to attain an assessment of eight at the end of Grade 9. The learning elements represent a wide scope of interconnected components essential to language acquisition: reading, writing, listening, speaking, interacting, knowledge of grammar and the purposeful use of language. In the FNCC Grade 9, the concept that language acquisition is closely connected with culture underpins the approach to acquisition of a foreign language.

Table 3. 29 Coverage of FNCC: English as a Foreign Language, Grade 6

Objectives of instruction	Objective breakdown (sub-strands)	Content areas related to the objectives	Transversal competences
Objective: Growing into cultural diversity and language awareness	3	Content area 1	T1, T2, T3
Objective: Language- learning skills	2	Content area 2	T1, T3,
Objective: Evolving language proficiency, interaction skills	3	Content area 3	T2, T4, T6
Objective: Evolving language proficiency, text interpretation skills	1	Content area 3	T4
Objective: Evolving language proficiency, text production skills	1	Content area 3	T5, T6

AC – Depth

Depth: Challenging

The expectations of the AC: L, Italian, Year 10 (F-10) are **challenging** in relation to depth of coverage of topics, skills and knowledge. The Content Descriptions in the AC expect students to demonstrate skills well beyond recall and memorisation as they learn to manipulate knowledge and skills in unfamiliar situations and to connect learning between the strands, sub-strands and threads, applying their understanding in a range of contexts. They are expected to demonstrate a deep understanding of the underpinning concept that effective communication, language and culture are closely interrelated. The Content Descriptions require higher-order thinking in *analysing, discussing, debating, explaining, evaluating, interpreting, negotiating, persuading, questioning, reflecting, reviewing and summarising*. Depth of understanding and sophistication of knowledge and skills are also evident in the Achievement Standards when students demonstrate they are able to “discuss topics such as education, work, the environment and youth issues as well as concepts from a range of learning areas”, “compare and evaluate ideas across languages and cultures”, “defend interpretations of texts and diverse points of view”, “elaborate, clarify and qualify ideas using supporting evidence and argument” and “reflect on their own and others’ use of language, the language choices made, and the cultural assumptions or understandings which shape them and analyse how culture affects communication”.

FNCC – Depth

Depth: Challenging

The expectations of the FNCC’s English as a Foreign Language course in Grade 9 are assessed as **challenging**, based on the coverage of skills, knowledge and understanding encountered in the syllabus. As is true for all languages, the FNCC bases the study of English as a foreign language on the Objectives of Instruction, Content areas, Transversal Competences and Assessment criteria for good knowledge and skills model of learning.

(FNBE, 2016, p. 425). Opportunities for deeper thinking and learning are provided through the Transversal Competences. Students are expected to “reflect on the relationship between language and culture in the context of the English language, realise that values differ, to set goals for his or her language learning and to assess his or her study techniques, negotiate the meanings of unknown expressions, take into account key perspectives related to cultural practices and able to find the main ideas, keywords, important details without preparation” (FNBE, 2016, p. 425). It is understood that learners will need to incorporate higher-order skills such as *analysing*, *synthesising*, *evaluating* and *reflecting* in order to attain the assessment targets in the subject and demonstrate deep understanding and knowledge.

While the Key content areas focus on the elements of language learning such as *Language-learning skill*, *Evolving language proficiency*, *interaction skills*, *text interpretation skills*, *text production skills*, the Objectives of Instruction appear to function as a guide for teachers to facilitate students to not only acquire the skills and become proficient in English but also “to support the pupil in developing his or her independence in applying his or her language proficiency creatively and in developing the preconditions for lifelong language learning”. Along with the Objectives of Instruction, the Transversal Competences provide guidance to teachers on how they can engage students in deep learning and higher-order thinking and the skills and knowledge needed to be successful linguists and to thrive in the 21st century. (FNBE, 2016, pp. 348-352). (15.2 Transversal Competences in Grades 7-9)

AC – Rigour

Rigour: Challenging

The AC: L, Italian, Year 10 (F-10) indicates a **challenging** degree of rigour. The terminology in the content descriptions demonstrates that students are expected to develop skills and understanding through a range of key processes such as *analysing*, *debating*, *evaluating*, *explaining*, *interpreting*, *negotiating*, *persuading*, *reflecting* and *summarising*. Students are expected to develop skills, knowledge and understanding that go beyond recalling and recognising learned concepts and principles. Learners are expected to manipulate the language appropriately according to context, audience and place, to be able to “interpret and create meaning”, “analyse and apply linguistic, cultural and textual features”, and “understand that language has the power to influence social relationships, beliefs and values”.

Elaborations provide additional suggestions designed to extend students’ proficiency and to engage them in more abstract thinking and reasoning. This is seen in the choice of verbs and phrases such as “debating pros and cons related to topics, using comparisons when expressing thoughts and ideas, negotiation options, solving problems and discussing alternative decisions, making judgements, comparing different perspectives, analysing and discussing the emotional impact of text features and reflecting on their own experiences of the process of translating”. Elaborations also provide suggestions for teacher action that encourage multiple approaches, strategies and solutions to help facilitate students’ deeper and broader engagement with the Italian language.

The expected learning involves considering diverse perspectives, analysing and challenging assumptions, reflecting on language and intercultural exchanges, analysing the features of a range of texts and creating authentic texts. Students are given multiple opportunities to apply

capabilities, strategies and knowledge to new contexts. This involves the ability to manipulate the language appropriately to suit time, place and audience and to apply critical and creative skills to solve problems and find solutions in unfamiliar contexts.

The AC: L, Italian, Year 10 (F-10) provides students with many opportunities for cognitive and intellectual growth. The knowledge and skills expected in the content descriptions and achievement standards are consistently challenging (ACARA, 2017k).

FNCC – Rigour

Rigour: Challenging

The skills, knowledge and understanding developed through the Objectives of Instruction, Key content areas, Transversal Competences and Final assessment criteria for good knowledge and skills mean that the FNCC's level of rigour is rated as **challenging**.

Key content areas are knowledge-based and require students to recognise content-specific vocabulary, apply grammar and language systems. There is no explicit mention of the systems of language, types of questions, verb conjugation, tense, and idiomatic language to be learnt. However, this is implicit in statements such as “the pupil to produce both spoken and written texts for different purposes on general topics or topics meaningful for the pupil while paying attention to the diversity of structure and good pronunciation” and “The pupils make observations and practise many different interactive situations using different communication channels”. This suggests that students are required to manipulate the language correctly and appropriately in new contexts. Analysis, evaluation and reflection on the dynamic nature of all languages is essential, as explained in the statement that “The pupils construct their perception of the multilingualism and parallel use of languages in the world as well as linguistic rights. They also study the development of English as a global lingua franca.” A high level of understanding and reflection is needed to use grammar, tense and register appropriate to time, place, context and audience (FNBE, 2016).

The content is presented within a framework that is similar across all languages, whether they be Mother Tongue, First or Second National Language or a foreign language, with limited English language-specific content. This is also true of the Transversal Competences where the skills required are generic skills applied to learning and developing competences and “enhance self-knowledge, self-respect and the formation of a personal identity”. There is a demand for critical and creative thinking in the Transversal Competences T1, T2, T3, T4, T5 and T6 in the syllabus for English as a foreign language.

Comparative Analysis

The AC: L, Italian, Year 10 (F-10) has been chosen as an exemplar for comparative analysis with the FNCC: English as a Foreign Language, Grade 9. At the end of Grade 9, the Finnish student will have been studying the language for seven years in comparison to the eleven years undertaken by the student learning through the AC. Again, the different starting points and number of years studying the language make a direct comparison of the curricula less straightforward.

The AC: L, Italian, Year 10 (F-10) and the FNCC: English as a Foreign Language, Grade 9 are largely comparable in terms of breadth. Although the AC has more detailed content in relation to content than the FNCC material, the targeted skills, knowledge and understanding are developmentally comparable. The FNCC has less prescriptive content focus while allowing for flexibility in the creation and delivery of learning experiences and deeper exploration of content through the Objectives of Instruction and the Transversal Competences.

Both curricula organise content, skills, knowledge and understanding around developing skills and strategies for effective communicating, appreciation of the systems of language and the conventions of its use and the strong interconnection between language and culture, the Italian- and English-speaking communities and the global community. An example from each curriculum is as follows:

- Reflect on participation in intercultural exchange, taking responsibility for contributing to mutual understanding (ACLIT087)
- Recognise how Italian language and culture have evolved and how they continue to change over time due to influences such as changing contexts and intercultural contact (ACLITU093)
- Promote the pupil's ability to reflect on phenomena related to the status and the variants of English and to provide the pupil with prerequisites for developing his or her intercultural competence (FNCC: Objectives of instruction, Growing into cultural diversity and language awareness, O1)
- Expand his or her perception of the globalising world and opportunities for acting in it (FNCC: Objectives of instruction, Growing into cultural diversity and language awareness, O2)

Both curricula emphasise the importance of engaging with a variety of texts (oral, written, visual and multimodal) to gain proficiency in the language and to facilitate understanding, as seen in the extracts below:

AC:

Read, discuss and review a range of imaginative texts and respond by expressing opinions....and considering language use and cultural meanings (ACLITC083); Translate a range of texts and discuss how to convey concepts across different linguistic and cultural contexts (ACLITC085); Analyse and apply linguistic, cultural and textual features of specific text types (ACLITU091).

FNCC:

Multiliteracy is developed and diverse texts are discussed in the teaching and learning of languages (FNCC: Task of the subject); Reading and listening to versatile standard-language and populated texts from various sources and to interpret them using different strategies (FNCC: Objectives of instruction, Evolving language proficiency, text interpretation skills, O9); Deepen their multiliteracy by expanding the range of texts ...by systems of verbal, visual, auditive, numeric, and kinaesthetic...analysing fiction, non-fiction....The emphasis is on practising the pupils' analytical, critical, and cultural literacy. (FNCC: Transversal competence T4).

The two curricula are also similar in terms of depth and rigour. In the AC, the content descriptions specify what students will learn and the achievement standards illustrate the depth of understanding and sophistication of knowledge and skills required at the end of each band level. Teachers can use the content elaborations to ascertain the depth of treatment needed for the content, skills and knowledge. Prescriptive detail and information around the key concepts and key processes to be taught for the Year 9-10 Band provide opportunities for cognitive and intellectual challenge. Students are required to demonstrate the ability to manipulate knowledge and skills to unfamiliar situations when they “initiate, sustain and extend discussions related to aspirations, relationships and contemporary issues” (ACLITC077) and “Contribute ideas, opinions and suggestions in interactions related to shared tasks and problem-solving, managing diverse views” (ACLITC078).

The depth of understanding and expected sophistication of knowledge and skills are also evident in the Achievement Standards of the AC when students demonstrate that they can:

discuss topics such as education, work, the environment and youth issues....they demonstrate grammatical control when using complex sentences.....they compare and evaluate ideas across languages and cultures.....they elaborate, clarify and qualify ideas using supporting evidence and argument....they exchange opinions and responses.....and make connections between language used, cultural concepts expressed and their own experiences or views....and the cultural assumptions or understandings which shape them.....they analyse how culture affects communication.

In keeping with the overall curriculum design, the skills, knowledge and understanding encountered in the FNCC are presented as a framework for all foreign languages with limited English language-specific content (FNBE, 2016). This is also indicative of the Transversal Competences where the skills required are generic skills applied to Mother Tongue, First and Second National languages and foreign language learning and acquisition in general.

Depth of coverage is implicit in the FNCC but is left to the teachers’ interpretation of the curriculum and pedagogy and methodology adapted to suit the community and environment of the students. Objectives of instruction are addressed to the teachers as facilitators to guide students to *Grow into cultural diversity and language awareness* and *Evolve language proficiency*. The naming of the Objectives of Instruction is the same as the Key content areas and the Assessment criteria for good knowledge and skills. The Transversal Competences are aligned to the relevant Objectives of Instruction and the Key content areas related to the objectives.

These elements demonstrate a holistic approach to teaching and learning and reflect the interconnectedness of all parts of the curriculum framework. Teachers in all subjects have a responsibility and obligation in supporting students to develop the skills of the Transversal Competences in their learning area and ultimately achieve the National goals of education laid down by the Basic Education Act (FBCC: 3.2) – *Growth as a human being and membership in society; Requisite knowledge and skills; Promotion of knowledge and ability, equality and lifelong learning*.

Finnish students learning English as a foreign language are also expected to “develop ethical thinkingby reflecting on right and wrong, good life and virtues, and the

principles of ethical ways of living” (T1). Together with the other goals listed below, this represents very sophisticated expectations of students in this age group.

See cultural diversity as a positive resource...recognise the influence of cultures, religions, and worldviews in society and daily life and to consider what is an unacceptable violation of human rights (T2);

Take responsibility for themselves and others and smooth running of daily life...recognise factors that promote or harm well-being of themselves or others and gain competence in promoting health, safety, and well-being (T3);

Learn to take initiative, anticipate possible difficulties in the working process, evaluate and take controlled risks, encounter failures and disappointments, and complete tasks with persistence (T6).

The FNCC is a framework for all languages rather than a language-specific curriculum. In comparison, the AC: L has language-specific curricula because the design of the AC: L recognises the features that languages share as well as those that make them unique. The philosophical basis for this is that “the curriculum content and achievement standards are different for each specific language because of inherent differences in the languages themselves and each language has its own distinctive structure, systems, conventions for use, related culture(s), place in the Australian and international communities, as well as its own history in Australian education” (AC: Languages, Introduction to Languages learning area).

In both curricula, there is an emphasis on an integrated and interconnected set of knowledge, skills, behaviours and dispositions.

The AC and FNCC both acknowledge the importance of the role of language and culture in communication and learning, as follows:

- The interrelationship of language, culture and learning provides the foundation for the Australian Curriculum: Languages. And In the languages learning area the focus is on both language and culture, as students learn to communicate meaningfully across linguistic and cultural systems, and different contexts. (AC: Key ideas)
- The cultural task of basic education is to promote versatile cultural competence and appreciation of cultural heritage.... It brings up the importance of the Sámi culture and various minorities in Finland.... One manifestation of cultural diversity in multilingualism. Each community and community member is multilingual. Parallel use of various languages in the school's daily life is seen as natural, and languages are appreciated. (FNCC: 3.1 Mission of basic education)

The AC: L does not dictate pedagogy or teaching methodology and the implementation of the AC is under the jurisdiction of the states and territories of Australia and the various government and non-government authorities within the states and territories. Whilst there is some similarity to the approach of the FNCC: FL in relation to content, there is a difference between the AC and the FNCC in terms of instruction time. In the FNCC (English, Languages other than English), the distribution of weekly lessons per year is mandated both for Grades 3-6 and 7-9.

Another distinct difference is the way in which the benefits of language acquisition are described in the Finnish curriculum. This learning area is directly associated with a range of very high-order skill; “Language is a prerequisite for learning and thinking.... Language learning promotes the development of thinking skills”.

Neither the AC nor FNCC has national examinations at the end of Year 10 and Grade 9 respectively. However, in the Final assessment criteria for good knowledge and skills in the FNCC, students are given a level of proficiency based on the Common European Framework of Reference.

Both the AC and the FNCC are driven by the vision that learners need to have the skills, capabilities and knowledge to live and thrive in their community and take on the challenges of an information-rich, globalised world in the 21st century. They encourage students to apply the particular skills and knowledge they have acquired in communicating in Italian as a second language (AC) and English as a foreign language (FNCC). Both curricula acknowledge the strong connection between language and culture and the capacity of these to shape identity.

Additional Observations

The FNCC: English as a Foreign Language for Grade 9 uses the same structures that apply across the languages (First and Second National Languages, Mother Tongue Languages and foreign languages) and Grades of learning, based on a common framework rather than language-specific curricula. The FNCC uses Objectives of Instruction, Content areas related to the objectives, Transversal Competences and Final assessment criteria to highlight the knowledge and skills applicable to all language acquisition. The Content areas and Transversal Competences of the syllabus represent what students are expected to know and understand and to be able to do.

Differences are also seen in the emphasis placed on the Mother Tongue languages and the First and Second National languages in the FNCC. The Mother Tongue is the language of instruction, depending on the background of the student, and may be Finnish, Swedish, Sámi, Roma, Sign language or any other language that is specified in Section 8 of the Government Decree 422/2012 (FNCC: 13.4). The value of pupils having the opportunity to study and learn in their Mother Tongue and acquire knowledge and perspectives relating to the community that speaks the Mother Tongue is embedded in the curriculum. If the Mother Tongue is not Finnish or Swedish, then learners are also immersed in the First National Language, Finnish or the Second National Language, Swedish as early as Pre-primary education and Grades 1 and 2 of the nine years of Basic Education. When pupils commence the study of a foreign language in Grade 3, it will be their third language, explained in the statement that “In Grades 3-6, all pupils receive instruction of mother tongue and at least two other languages” (FNCC 14.4.3). In Grades 8-9 students are given the opportunity to study a further fourth language, with the explanation that “The instruction of the optional language is usually provided in Grades 8-9 ... [this will be the] third or fourth language the pupil studies after his or her mother tongue, and therefore the pupil already has a lot of experience of language learning” (Foreign language, B2 syllabus in Grades 7-9).

The FNCC not only gives students multiple opportunities to become proficient linguists but also acknowledges the languages and cultures of the diverse communities that make up

Finnish society in the 21st century. This is most evident in the case of education for indigenous learners and communities, whereby “the three different Sámi languages and their dialects as well as cultural awareness carried by language are taken into account” (FNCC: Special questions of language and culture 9.1).

The AC acknowledges other languages and cultures in its provision of fourteen world languages and the two Frameworks. The Framework for Aboriginal Languages and Torres Strait Islander Languages acknowledges the diverse nature of the many languages and culture of the first peoples of Australia. The cross-curriculum priority of Aboriginal and Torres Strait Islander Histories and Cultures further supports the learning of and about the Indigenous peoples of Australia.

h) General Capabilities

Comparative Curricula

Australian Curriculum: General Capabilities

Version 8.3, 2016

Finnish National Core Curriculum: Transversal Competences

Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Year 2

Finnish National Core Curriculum: Grades 1-2

Learning Area/Subject

Australian Curriculum: General Capabilities (AC: GC)

Finnish National Core Curriculum: Transversal Competences (FNCC: TC)

Expectations: Knowledge and Skills

The AC identifies seven General Capabilities that play a significant role “in equipping young Australians to live and work successfully in the 21st century” (ACARA, 2017).

The General Capabilities include Literacy, Numeracy, Critical and Creative Thinking, ICT Capability, Personal and Social Capability, Ethical Understanding, and Intercultural Understanding.



Figure 3. 3 General Capabilities

From “General capabilities in the Australian Curriculum” by ACARA, 2018 (PDF documents: <https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities>). Copyright by Australian Curriculum, Assessment and Reporting Authority (ACARA).

Each capability is organised into elements and sub-elements within continua that focus on the development of skills and attributes of learners as they progress through their schooling.

The continua establish expectations of learning at the end of Foundation, Year 2, Year 4, Year 6 and Year 10.

By the end of Year 2, learners are expected to have developed skills, as they learn the content of the learning areas, across all seven capabilities.

Ethical Understanding

This capability develops skills that enable students to understand ethical concepts, understand how to make reasoned, ethical judgements and understand the influence that their values and behaviour may have on others in the community. By the end of Year 2, learners are expected to be able to describe and discuss concepts such as right, wrong, honesty and fairness in familiar situations. They describe the effects of personal feelings on behaviour and understand that people may make different decisions depending on their circumstances. They will also have an increasing understanding of their rights and responsibilities, especially in school-based situations.

Intercultural Understanding

This capability develops an understanding of cultures, languages and beliefs, focusing on the development of skills related to empathy and communication. By the end of Year 2, students are expected to discuss how diversity provides opportunity for new experiences, describe how different cultures may have differing modes of communication, show an appreciation for the perspectives of others and identify and describe factors that may influence acceptance and inclusion.

Personal and Social

This capability develops skills related to the learners' understanding of themselves and others, being able to manage relationships by learning to work collaboratively, developing empathy, adapting to challenges, and building skills related to leadership in a range of contexts. By the end of Year 2, students are expected to describe personal interests and achievements, develop skills relating to persistence and independence, discuss strengths and weaknesses, and set goals for learning. They are also expected to identify different points of view, recognise ways to resolve conflict, work cooperatively with others and discuss ways to take responsibility for their actions.

Critical and Creative Thinking

This capability outlines the skills students require to become analytical, innovative, and creative. By the end of Year 2, students are expected to identify and organise information to support their learning, come up with new ideas and make predictions about the results of new ideas. Students are also expected to develop skills to enable them to identify a range of thinking strategies, identify alternatives when presented with new information and evaluate if they have achieved their goals/tasks.

Information and Communication Technology

This capability develops the skills students require to be effective users of technology, to locate, present and store information and to understand how to limit risks to themselves and

others in digital environments. By the end of Year 2, students are expected to have an understanding of the safe use of ICT at school and to recognise processes for locating, using and storing digital information. Students are also expected to develop skills which enable them to safely share information with others in a range of formats and to be able to use a range of devices and tools and describe these using basic terminology.

Literacy

This capability develops the knowledge and skills to interpret and use language for learning and communicating across a range of contexts. Students develop literacy skills through learning areas as they “access, understand, analyse and evaluate information, present ideas and opinions and interact with others. Success in any learning area depends on being able to use the significant, identifiable and distinctive literacy that is important for learning and representative of the content of that learning area” (ACARA, 2017e). By the end of Year 2, students are expected to understand how to read and view simple texts to gather information, compose and edit a small range of learning area texts, participate in discussions and prepare presentations on learning area topics.

Numeracy

This capability focuses on developing the ability to transfer and apply the knowledge and skills of Mathematics across learning areas. These opportunities help students recognise the interconnected nature of mathematical knowledge, other learning areas and the wider world, and encourage them to use their mathematical skills in many contexts. By the end of Year 2, students are expected to understand numbers up to four digits, estimate the solution to a problem and proceed to calculate the answer. They are also expected to be developing skills related to spatial reasoning, reading maps and understanding simple fractions. They understand how to collect and represent data in simple forms and are developing measurement skills such as estimating, measuring and ordering.

In Finland, the FNCC identifies seven transversal competences that play a significant role “to support growth as a human being and to impart competences required for membership in a democratic society and a sustainable way of living” (FNBE, 2016).

The Transversal Competences include Thinking and Learning to Learn, Cultural Competence, Interaction and Self-expression, Taking Care of Oneself and Managing Daily Life, Multiliteracy, ICT Competence, Working Life Competence and Entrepreneurship, and Participation, Involvement and Building a Sustainable Future.

These competences are described in broad terms in the introductory passages of the curriculum material and then in more specific detail at the beginning of each grade unit. The age-appropriate objectives of each transversal competence are detailed at the start of each subject, with the *Objectives of instruction* highlighting the subject objectives and linking these both to content and transversal competences.

For students in Grades 1 and 2, the Transversal Competences focus on the development of self-knowledge and personal identity in an environment that ensures that each student is heard, seen and appreciated. Emphasis is placed on skills relating to the development of collaboration skills, cultural awareness and a deepening relationship with nature. The

foundations for transversal competence are laid in pre-primary education and are further developed in the first grades of basic education (FNBE, 2016, p. 136).

Thinking and learning to learn

This competence underpins the development of the other competences. During the first two years of basic education, students are encouraged to see themselves as learners and to appreciate how their environment influences their thinking and learning. Advice is provided to teachers about learning opportunities that promote the joy of learning, reflection, creativity, collaboration and discovery. At this stage of schooling, students discuss choices related to study. The learning skills include *asking questions, observing, listening, locating information, forming new ideas, describing, analysing, planning for learning, setting goals, self-assessment and communication*.

Cultural competence, interaction and self-expression

Elements of this competency offer opportunities for students to engage with a diverse range of people in various situations. Within the first two years of basic education, students are supported to develop an understanding of their own cultural background and to appreciate the cultural traditions of others with a focus on local communities. Students are also introduced to the United Nations Convention on the Rights of the Child and encouraged to reflect on the significance of this in their own lives. The self-expression element encourages students to express themselves using diverse modes of presentation and to engage in creative activities, with the opportunity to develop physical and manual skills.

Taking care of oneself and managing daily life

This competence develops independence and the ability to identify and manage emotions, outlining skills related to road safety, safe use of technical devices, personal safety strategies and seeking help, developing good manners, and becoming aware of issues related to consumer and financial literacy at an age appropriate level.

Multiliteracy

This competence focuses on assisting students to interpret, produce and evaluate a range of age-appropriate texts. Texts are broadly defined as “information presented by systems of verbal, visual, auditive, numeric and kinaesthetic symbols” (FNBE, 2016). During the first two years of basic education, as students engage with the content of the Multiliteracy competence, it is envisaged that their basic reading and writing skills will become more fluent. This competence highlights the development of skills relating to understanding numeric information, visual literacy, locating information from a range of sources, communication, expressing views and asking questions. It also focuses on the development of critical thinking skills through examining and comparing imaginary and real-world texts and identifying the authors’ purposes. For multiliteracy to be developed, the environment must be text-rich and varied text modes must be available including texts produced and selected by students (FNBE, 2016).

ICT Competence

This competence comprises four key areas outlined in the curriculum, with *Practical skills and personal production* encompassing the use of devices, software and services including keyboarding skills and text production. Age-appropriate programming tasks and gamification are part of the learning for these students. *Responsible and safe use of ICT* encompasses safe ways of using ICT and developing good working posture. *Information management and inquiry-based and creative work* encompasses developing skills related to using ICT to search for information and collaborate with others. Students develop communication and social networking skills through *Interaction and networking*.

Working life competence and entrepreneurship

This competence develops collaboration skills and empathy, personal responsibility, personal interests and strengths, confidence in unfamiliar situations, cooperation with others outside the school environment and a broad understanding of the importance of work and a range of occupations.

Participation, involvement and building a sustainable future

This competence focuses on the development of student voice and agency, with the emphasis on students making decisions on issues that concern them. During the first two years of basic education, students are encouraged to reflect on and plan for their own learning. They are exposed to concepts relating to justice, equity and the rules governing democratic activity. This competence also promotes reflective practices and increasing understanding of what a fair and sustainable future may entail both at the local and global level.

Comparative Analysis

The AC: GC and the FNCC: TC both outline the skills, attitudes and values that each nation has identified as being crucial for the development of a well-rounded and capable future citizen. Both in Australia and Finland, the expectation is that capabilities, or competences, will develop as students engage with the content of the learning areas/subjects.

The Transversal Competences project strong themes associated with sustainability, global awareness and the relationship of the student's environment to his/her learning. These themes are not evident within the AC's General Capabilities. However, the AC's Cross-Curriculum Priority of Sustainability addresses the issues of sustainability, the environment, world views and planning for the future, all of which align to the concepts embedded in the Transversal Competences.

Both curricula explicitly highlight the connections between the competences and the capabilities and the content of the learning areas, although these connections receive a different emphasis in each of the documents. In the AC, for example, the General Capabilities are indicated by the use of icons alongside references to learning area content. These icons provide educators with guidance on development of the capability within the teaching and learning program. In the FNCC, the Transversal Competences are matched to subject Learning Objectives at the beginning of each subject, with the expectation that educators will develop the competence within their teaching and learning programs.

Differences in the curricula relate to items of student voice or agency, the organisation of the content or skills, the inclusion of different skill sets and advice on teaching strategies. The Transversal Competences include pedagogical direction for educators to support students in developing the skills required for input and choice about their learning.

While there are broad similarities between the General Capabilities and the Transversal Competences, the presentation in each curriculum varies. For example, the skills related to critical and creative thinking are identified in several of the Transversal Competences. In the AC's General Capabilities, these skills are explicitly articulated within one capability with the same title.

The General Capabilities include skills relating specifically to numeracy and its application within learning areas. This is not evident to the same degree within the Transversal Competences. For example, Multiliteracy includes statements regarding the development of understanding everyday numeric information. The competences of Working life and Entrepreneurship home in on the development of skills related to consumer and financial literacy, but the statements do not articulate numeracy skill development in the same detail as can be found in the AC's Numeracy capability.

Another difference between the two curricula is seen in the provision of skills to be addressed in the early years of basic education. In Finland, this learning includes road safety, the development of good manners and an understanding of the UN Convention on the Rights of the Child; these are not specifically identified within the AC's General Capabilities.

Finland's Transversal Competences provide statements that guide educators to develop lessons and environments that would best develop the skills described in each of the specific competences. By comparison, the AC offers no advice on pedagogy or preferred learning environments in relation to the General Capabilities, leaving this to the state and territory authorities and their schools.

Year/Grade Level

Australian Curriculum: Year 6

Finnish National Core Curriculum: Grade 6

Learning Area/Subject

Australian Curriculum: General Capabilities (AC: GC)

Finnish National Core Curriculum: Transversal Competences (FNCC: TC)

Expectations: Knowledge and Skills

The AC identifies seven capabilities that play a significant role "in equipping young Australians to live and work successfully in the 21st century" (ACARA, 2017m).

The General Capabilities include:

- Literacy
- Numeracy
- Critical and Creative Thinking
- ICT Capability

- Personal and Social Capability
- Ethical Understanding
- Intercultural Understanding.

Each capability is organised into elements and sub-elements within continua that focus on the specific skills and attributes learners should develop as they progress through their schooling. The continua establish expectations of learning at the end of Foundation, Year 2, Year 4, Year 6 and Year 10. At Year 6, the General Capabilities describe the lower levels of skill development expected from students.

The general capabilities are presented as learning continua or sequences that describe the knowledge, skills, behaviours and dispositions that students can reasonably be expected to have developed by the end of particular years of schooling (ACARA, 2017n).

The FNCC identifies seven Transversal Competences that play a significant role “to support growth as a human being and to impart competences required for membership in a democratic society and a sustainable way of living” (FNBE, 2016). The relationship between these Transversal Competences and the disciplines was taken into account as subject objectives and key content areas were defined and developed.

Finland’s Transversal Competences are:

- Thinking and learning to learn
- Cultural Competence, interaction and self-expression
- Taking care of oneself and managing daily life
- Multiliteracy
- ICT Competence
- Working life competence and entrepreneurship
- Participation, involvement and building a sustainable future.

The competences are described in broad terms within the introductory passages of the curriculum material and then in more specific detail at the beginning of each Grade unit, with age-appropriate objectives of each Transversal Competence identified at the beginning of each Grade unit. At the start of each subject, *Objectives of instruction* highlight the subject objectives and link these both to content and transversal competences.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

The AC: GC are considered **comprehensive** at the end of Year 6 due to the volume of capabilities and attributes they encompass. The General Capabilities continua describe 85 different indicators that learners are expected to demonstrate prior to the end of Year 6. Many of these are linked to each other and build upon the expectations established in the preceding levels.

Table 3. 30 AC: Count of capabilities and General Capabilities continua for Year 6

General Capability	Number of capabilities
Critical and Creative Thinking	12
Personal and Social Capability	16
Information Communication Technology Capability	14
Intercultural Understanding	9
Ethical Understanding	8
Numeracy	12
Literacy	14

Three of the capabilities are closely aligned to the learning areas. For example, many of the capabilities described within the Personal and Social Capability have related or similar skills described within the Health and Physical Education learning area. Capabilities described within the Numeracy continua are closely aligned to the content and proficiencies of the AC: Mathematics area, and the capabilities described within the Literacy continua are closely aligned to content and processes described in the AC: English. Additionally, capabilities described within the ICT Capability have some alignment with the Digital Technologies learning area, with six of the nine capabilities aligned with content descriptions in the Digital Technologies curriculum.

FNCC – Breadth

Breadth: Comprehensive

For students in Grade 6, FNCC: TC are **comprehensive** in breadth. They include a broad range of skills to be developed across a range of domains; these are personal and social development, understanding ICT, literacy, sustainability, global awareness, thinking skills, cultural awareness, communication and developing an understanding of equality.

AC – Depth

Depth: Fundamental

At Year 6, the AC's General Capabilities require students to identify and discuss some sub-elements within each capability, work that emphasises analysis and evaluation. Although these capabilities are of a higher order, they are not broadly applied across the capabilities; therefore, the level of depth is deemed to be **fundamental**.

The verbs, describing actions students would undertake by the end of Year 6, still focus largely on lower-order skills such as identify, describe, discuss and use, with the inclusion of some higher-order skills such as analyse, assess, compare and explain. On balance, although they do involve more complicated skills than earlier levels of the continua, the actions described at Year 6 are appropriate for the age group and not overly demanding.

FNCC – Depth

Depth: Fundamental

For students in Grade 6, Finland's Transversal Competences are **fundamental** in depth. Students are provided with opportunities to pose questions, understand points of view, critically assess information, use language diversely and skilfully, analyse texts and work in teams. They are explicitly described in the introduction of each learning area and pedagogical guidance is provided to ensure educators are able to model and teach the material. While some higher-order skills are mentioned, these are not applied broadly across the Transversal Competences.

AC – Rigour

Rigour: Moderate

The AC's General Capabilities are deemed to be **moderate** in their level of rigour. All capabilities build on those described for Year 4 and are designed to prepare students for future learning.

An example is found in a sub-element of Critical and Creative Thinking, headed Pose Questions. At the end of Year 2, students should be able to ask *exploratory questions based on personal interests and experiences*, and by the end of Year 6 they should be able to *pose questions to clarify and interpret information and probe for causes and consequences*.

FNCC – Rigour

Rigour: Moderate

Grade 6 students encounter Transversal Competences that are **moderate** in rigour. The competences build upon those described in Grades 1 and 2 and the level of skills described demonstrates an appropriate growth of complexity between the stages of schooling.

For example, the ICT competence includes the category of *Responsible and safe use of ICT*. Over time, students move from "Together with the teacher, the pupils search for safe ways of using ICT and related etiquette" at the end of Grade 2 to an expectation at the end of Grade

6 that “pupils are guided in responsible and safe use of ICT, good manners and knowing basic copyright principles”.

Comparative Analysis

The AC: GC and the FNCC: TC both outline the skills, attitudes and values that each nation has identified as being crucial for the development of a well-rounded and capable future citizen. The development of these skills in both curricula is expected to occur as students engage with the content of the learning areas/subjects.

Finland’s Transversal Competences project strong themes related to sustainability, global awareness and the influence of the environment on learning. These themes are not evident within the AC’s General Capabilities; however, the AC’s Cross-Curriculum Priority of Sustainability addresses issues of sustainability, the environment, world views and planning for the future which align to the concepts outlined in the Transversal Competences.

Additionally, the Finnish Transversal Competences expect students to develop and understand the significance of human rights treaties and a growing familiarity of the UN Convention on the Rights of the Child. This aspect of the Transversal Competences is characterised by a strong global focus that is not as evident in the AC’s General Capabilities. For example, the AC’s Intercultural Understanding capability expects that students will develop empathy for others in local, national and global contexts, but this is not expressed with the level of specificity required by the Transversal Competences.

There are other differences in the expectations of Grade 6 students in relation to the development of what might be regarded as global skills. This is seen in the FNCC, where the application of *Cultural competence, interaction and self-expression* requires students to both use their Mother Tongue and other languages skilfully by the end of Grade 6. The AC’s General Capabilities require students to be able to describe the role language plays in the development of group and national identities, but there is no specific requirement for students to learn or communicate in another language. In Finland, *Working life competence and entrepreneurship* requires students to engage more widely outside the school community and to obtain a deeper understanding of the value of work and the nature of various professions. There is no equivalent in the AC’s General Capabilities.

In relation to preparing students for life beyond the classroom, the AC identifies Numeracy as a key area for skill development. This capability addresses concepts related to estimation and calculation, financial literacy, data interpretation, spatial reasoning (including the ability to interpret maps) and skills relating reading and comprehending timetables both from print and digital sources. These skills are not articulated in the same way within the Transversal Competences. Some skills related to financial literacy and consumer literacy are identified within the competence known as *Taking care of oneself and managing daily life*, but the expectations of students’ learning are not as explicit or comprehensive as those found in the AC.

Year/Grade Level

Australian Curriculum: Year 10

Finnish National Core Curriculum: Grade 9

Learning Area/Subject

Australian Curriculum: General Capabilities (AC: GC)

Finnish National Core Curriculum: Transversal Competences (FNCC: TC)

Expectations: Knowledge and Skills

The AC identifies seven capabilities that play a significant role “in equipping young Australians to live and work successfully in the 21st century” (ACARA, 2017m).

The General Capabilities include:

- Literacy
- Numeracy
- Critical and Creative Thinking
- ICT Capability
- Personal and Social Capability
- Ethical Understanding
- Intercultural Understanding.

Each capability is organised into elements and sub-elements within continua that focus on the specific skills and attributes learners should develop as they progress through their schooling. The continua establish expectations of learning at the end of Foundation, Year 2, Year 4, Year 6 and Year 10.

The FNCC identifies seven Transversal Competences that are designed “to support growth as a human being and to impart competences required for membership in a democratic society and a sustainable way of living” (FNBE, 2016).

Finland’s Transversal Competences are:

- Thinking and learning to learn
- Cultural Competence, interaction and self-expression
- Taking care of oneself and managing daily life
- Multiliteracy
- ICT Competence
- Working life competence and entrepreneurship
- Participation, involvement and building a sustainable future.

The Transversal Competences are described in broad terms within the introductory passages of the curriculum material and then in more specific detail at the beginning of each Grade unit. The age-appropriate objectives of each transversal competence are detailed at the beginning of each Grade unit. For each subject, Objectives of instruction are provided that highlight the subject objectives and link these to content and to transversal competences.

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Comprehensive

The AC” GC are considered **comprehensive** in breadth at Year 10 level. The learning continua of the seven capabilities contain 85 indicators that set the expectations for students.

Table 3. 31 AC: Count of capabilities in the General Capabilities continua for Year 10

General Capability	Number of capabilities
Critical and Creative Thinking	12
Personal and Social Capability	16
Information Communication Technology Capability	14
Intercultural Understanding	9
Ethical Understanding	8
Numeracy	12
Literacy	14

FNCC – Breadth

Breadth: Comprehensive

By the end of Basic Education, the Transversal Competences are considered **comprehensive** in breadth. The competences describe a wide set of skills expected to be developed across the seven domains identified. These skills are developed within each subject in ways that are most suitable for the learning requirements of the subject. The emphasis is on thinking skills, personal development and management, cultural well-being, empathy, ICT skills and global awareness.

AC – Depth

Depth: Challenging

For students in Year 10, the General Capabilities are **challenging** in depth as they require students to use higher-order thinking skills such as *analysis*, *justification* and *evaluation* in

increasingly diverse and complex situations. The capabilities described within the final level of each continua establish high expectations for the development of sophisticated capabilities that are then transferable across learning areas.

FNCC – Depth

Depth: Challenging

For students completing Basic Education, Finland's Transversal Competences are considered **challenging** in depth. The skills are complex and require pupils to develop aptitudes and abilities that they can transfer from one subject to another and from one situation to another. The competences are designed for application beyond the school environment and to assist students to transfer knowledge and skills acquired outside school into learning experiences within the school context.

AC – Rigour

Rigour: Challenging

For Year 10 students completing study on a developmental continuum, the expectations of the AC: GC are considered to be **challenging**. At Level Six in the AC, the capabilities described require from students higher-order thinking and the demonstration of a broad range of knowledge and behaviours in their learning across subjects. Examples of the complex skills expected of students by this level are detailed below.

Table 3. 32 AC: General Capabilities at Level 6

<p>Personal and Social Capability Level 6</p> <p><u>Contribute to Civil Society</u></p> <p>plan, implement and evaluate ways of contributing to civil society at local, national, regional and global levels</p>	<p>Personal and Social Capability Level 6</p> <p><u>Develop Leadership skills</u></p> <p>propose, implement and monitor strategies to address needs prioritised at local, national, regional and global levels, and communicate these widely</p>	<p>Ethical Understanding Level 6</p> <p><u>Examine Values</u></p> <p>analyse and explain the interplay of values in national and international forums and policy making</p>	<p>Intercultural Understanding Level 6</p> <p><u>Challenge Stereotypes and Prejudices</u></p> <p>critique the use of stereotypes and prejudices in texts and issues concerning specific cultural groups at national, regional and global levels</p>	<p>Critical and Creative Thinking Level 6</p> <p><u>Seek Solutions and put ideas into action</u></p> <p>assess risks and explain contingencies, taking account of a range of perspectives, when seeking solutions and putting complex ideas into action</p>
<p>ICT Capability Level 6</p> <p><u>Identify the impacts of ICT in society</u></p> <p>assess the impact of ICT in the workplace and in society, and speculate on its role in the future and how they can influence its use</p>	<p>Numeracy Level 6</p> <p><u>Interpret Data Displays</u></p> <p>evaluate media statistics and trends by linking claims to data displays, statistics and representative data</p>	<p>Literacy Level 6</p> <p><u>Deliver Presentations</u></p> <p>plan, research, rehearse and deliver presentations on more complex issues and learning area topics, combining visual and multimodal elements creatively to present ideas and information and support opinions and engage and persuade an audience</p>	<p>Literacy Level 6</p> <p><u>Listen and respond to learning area texts</u></p> <p>listen to a range of extended spoken and audio texts, including audio-visual texts, and respond to, interpret and evaluate ideas, information and opinions</p>	<p>ICT Capability Level 6</p> <p><u>Generate solutions to challenges and learning area tasks</u></p> <p>Design, modify and manage complex digital solutions, or multimodal creative outputs or data transformations for a range of audiences and purposes</p>

FNCC – Rigour

Rigour: Challenging

The Transversal Competences are considered **challenging** in rigour by the end of Basic Education. They are designed to develop in students the skills essential for life beyond school, emphasising international issues, management of daily life, effective communication in a range of situations using a wide range of modes, planning for a sustainable future and valuing their strengths.

Examples of the skills and attitudes expected from students at this level are included in Table 3.33.

Table 3. 33 *Finnish Basic Education transversal competences at Year 10*

<p>Thinking and learning to learn T1</p> <p>The different ways of constructing knowledge are explored together, and the pupils are encouraged to express their own experiential knowledge and to consider its significance to their way of thinking. The pupils have the opportunity to make observations and improve their perception, to search information in many different ways, and to observe topics critically from different perspectives.</p>	<p>Cultural competence, interaction and self expression T2</p> <p>By applying their knowledge and skills, the pupils learn to express their opinions constructively and to act in various public presentation, cooperation, and interaction situations</p>	<p>Taking care of oneself and managing daily life T3</p> <p>The pupils are given more opportunities for participating in the planning and implementation of school work and the learning environment. The pupils are guided to recognise factors that promote or harm the well-being of themselves or others and to gain competence in promoting health, safety, and well-being.</p>	<p>Taking care of oneself and managing daily life T3</p> <p>Ethical questions and future opportunities related to technology are also discussed with the pupils. The pupils are guided to observe their consumer habits from the viewpoint of a sustainable future, to observe advertising communication analytically, and to be critical and responsible consumers</p>	<p>Multiliteracy T4</p> <p>The emphasis in multiliteracy development increasingly shifts to context and situation-specific texts. The pupils' multiliteracy is advanced by introducing them to narrative, descriptive, instructive, argumentative and reflective text genres. Cultural, ethical, and environmental literacy are supported in teaching and learning.</p>
<p>ICT Competence T5</p> <p><i>Interaction and networking:</i></p> <p>The teaching and learning includes using social media services and experiencing the importance of cooperation and interaction for learning, exploratory work, and creativity. The pupils are guided to find suitable communication channels and styles for different uses.</p>	<p>Working life competence and entrepreneurship T6</p> <p>In functional learning situations, the pupils learn to plan work processes, set hypotheses, try different alternatives, draw conclusions, and find new solutions as conditions change. At the same time, they learn to take initiative, anticipate possible difficulties in the working process, evaluate and take controlled risks, encounter failures and disappointments, and to complete tasks with persistence</p>	<p>Working life competence and entrepreneurship T6</p> <p>They are encouraged to recognise and develop their own aptitudes, strengths, and interests and to make reasoned choices regarding studies and work from their own starting points while being conscious of the impact of traditional gender roles and other role models.</p>	<p>Participation, involvement and building a sustainable future T7</p> <p>The pupils get information on and experiences of different ways and forms of societal involvement, such as peer supporter activities, environmental activities, and volunteer work, or involvement through the media, the arts, the public sector, non-governmental organisations, and political parties</p>	<p>Participation, involvement and building a sustainable future T7</p> <p>Through their participation, the pupils can learn to express their views constructively, search for solutions in cooperation with others, and consider justifications for different ways of acting from various perspectives. The pupils learn negotiation skills, arbitration, and conflict resolution.</p> <p>Concrete actions and cooperation projects for the good of the environment and other people expand the pupils' sphere of responsibility</p>

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Comparative Analysis

The AC: GC and the FNCC: TC both outline the skills, attitudes and values that each nation has identified as being crucial for the development of a well-rounded and capable future citizen. At the Year 10 level, the skills are complex and focus on the development of abilities for use in post-school life and in the workplace.

The skills expected of Australian and Finnish students by the end of Year 10 and Grade 9, respectively, are developmental in nature. Young learners move from experiences in familiar, local contexts to broader, more global contexts as they progress through the stages of schooling. The table below demonstrates the development of a set of skills from the initial stages of schooling through to the final level of the comparison. The first example illustrates the unique approach adopted by each country towards personal safety. The Finnish Transversal Competences emphasise safe access to the community, including the safe use of roads and transport. This is not found to the same degree in the AC, although the Health and Physical Education learning area provides opportunity for the development of road safety skills within the *Being Healthy, Safe and Active* strand of the *Personal and Social Capability*. This combined application of two dimensions (learning area content and general capability) reflects the design and intent of the AC.

Table 3. 34 AC/FNCC approaches to personal safety and care

	Year 2 / Grade 2	Year 6 / Grade 6	Year 10 / Grade 9
AC: General Capabilities Personal and Social Capability	<i>Become confident, resilient and adaptable</i> Undertake and persist with short tasks, within the limits of personal safety	<i>Become confident, resilient and adaptable</i> Devise strategies and formulate plans to assist in the completion of challenging tasks and the maintenance of personal safety	<i>Become confident, resilient and adaptable</i> Evaluate, rethink and refine approaches to tasks to take account of unexpected or difficult situations and safety considerations
FNCC: Transversal Competences Taking care of oneself and managing daily life (T3)	Attention is paid to the pupils' independent and safe mobility in their surroundings, to the use of protective and safety equipment, and to improving the pupils' skills and knowledge as pedestrians and cyclist.	The pupils' independent mobility in a wider area and in public transport is supported. Particular attention is paid to the pupils' skills of safe cycling and ensuring their own and other people's safety on the road. The pupils are guided in using appropriate safety and protective equipment and taught to recognise key symbols related to safety.	The pupils are also guided to act sustainably and responsibly in various situations in the traffic, particularly when riding a bicycle or a moped, and to use protective and safety equipment, and not to drive under the influence of intoxicants.

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The national curricula of both countries promote the development of global perspectives. Initial concepts are of a local or familiar nature, and issues are examined within supported learning environments. As young people develop skills during the stages of schooling, they

become more confident in the use of proactive behaviours that reflect a broader outlook and an understanding of active contribution to society.

Table 3. 35 AC/FNCC approaches to global perspectives

	Year 2 / Grade 2	Year 6 / Grade 6	Year 10 / Grade 9
AC: General Capabilities Personal and Social Capability	<i>Contribute to civil society</i> Describe how they contribute to their homes, classrooms and local communities, and how others care for and assist them	<i>Contribute to civil society</i> Identify a community need or problem and consider ways to take action to address it	<i>Contribute to civil society</i> Plan, implement and evaluate ways of contributing to civil society at local, national, regional and global levels
FNCC: Transversal Competences Participation, involvement and building a sustainable future (T7)	Together with the teacher, the pupils consider what a fair and sustainable future in their own country and in the world means to them and how they can contribute to building such a future.	They are guided to understand the significance of their choices, their way of living and their actions not only to themselves but also to their community, society and nature.	During basic education, the pupils begin to form an understanding of why studying and involvement matter, what the significance of a sustainable way of living is, and how knowledge and skills acquired at school can be used in building a sustainable future.

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i) Cross-Curriculum Priority – Aboriginal and Torres Strait Islander Histories and Cultures

Comparative Curricula

Australian Curriculum: Aboriginal and Torres Strait Islander Histories and Cultures
Version 8.3, 2016

Finnish National Core Curriculum: Sámi Histories, Cultures and Languages
Version 2016:5, 2014

Year/Grade Level

Australian Curriculum: Years 2, 6 and 10

Finnish National Core Curriculum: Grades 2, 6 and 9

Learning Area/Subject

Australian Curriculum: Aboriginal and Torres Strait Islander Histories and Cultures

Finnish National Core Curriculum: Sámi Histories, Cultures and Languages

Expectations: Knowledge and Skills

In this comparison of the representation of Indigenous¹ Peoples in the AC and the FNCC, the Sámi People are recognised as the Indigenous inhabitants of Finland. This comparison posits that culture is inextricably linked to language (Kim, 2003).

One of the more observable contrasts between Australia and Finland is the status and usage of first languages. In Finland, there are only three living Sámi languages in a country that spans 338,000 km². The curriculum strongly encourages instruction in these languages. In Australia, there remain up to 150 Aboriginal languages in daily use, with most of these considered to be endangered. Only about 13 languages are still being actively transmitted to children in a country that spans 7.692 million km².

Australian Curriculum

In the AC, the focus on Aboriginal and Torres Strait Islander Histories and Cultures is presented as a Cross-Curriculum Priority (CCP) – one of three – that is to be delivered through all learning areas, where relevant, and seeks to develop cultural and intercultural awareness / responsiveness in all students.

The AC states that the three cross-curriculum priorities:

...are only addressed through learning areas and do not constitute curriculum on their own, as they do not exist outside of learning areas. Instead, the priorities are identified wherever they are developed or have been applied in content descriptions. They are also identified where they offer opportunities to add depth and richness to student

¹ The term 'Indigenous' is used as a generic term representative of First Peoples, First Nations, Aboriginal and Torres Peoples and other Indigenous people across the world.

learning in content elaborations. They will have a strong but varying presence depending on their relevance to the learning area (ACARA, 2017o).

Key Ideas describe the three key concepts of Country/Place, Culture and People; these are supported by their nine Organising Ideas. Within the learning areas, Content Descriptions and Elaborations highlight the requirement and suggestions for the CCP's inclusion in the curriculum. References to Aboriginal and Torres Strait Islander Histories and Cultures are found in the learning areas of the Humanities and Social Sciences, Languages and The Arts. The AC's achievement standards are not inclusive of the CCPs.

In the Science curriculum, for example, the CCP is embedded as follows:

Students will have opportunities to learn that Aboriginal and Torres Strait Islander Peoples have longstanding scientific knowledge, traditions and developed knowledge about the world by: observation, using all the senses; prediction and hypothesis; testing (trial and error); making generalisations within specific contexts such as the use of food, natural materials, navigation and sustainability of the environment. (ACARA, 2017p).

A statement is provided for each learning area about how it contributes to the priority. For example, in the Mathematics curriculum, the suggestions are that:

Students can explore connections between representations of number and pattern and how they relate to aspects of counting and relationships of Aboriginal and Torres Strait Islander cultures. Students can investigate time, place, relationships and measurement concepts within Aboriginal and Torres Strait Islander contexts. Through the application and evaluation of statistical data, students can deepen their understanding of the lives of Aboriginal and Torres Strait Islander Peoples (ACARA, 2017p).

Within the General Capabilities dimension of the AC, there is no specific mention of Aboriginal and Torres Strait Islander cultures. It can be inferred through the learning continua provided for Intercultural Understanding (*develop respect for cultural diversity, and consider and develop multiple perspectives*), Personal and Social Capability (*appreciate diverse perspectives*) and in Ethical Understanding (*recognise ethical concepts*).

The AC's advice on Student Diversity considers notions of 'equity' and includes Aboriginal and Torres Islander students in its section on English as an Additional Language or Dialect (EAL/D).

Finnish National Core Curriculum

The FNCC is "built on a diverse Finnish cultural heritage" and supports all students "in building their personal cultural identity ... in their own culture and community ... and respect for cultural diversity ... thus laying a foundation for culturally sustainable development" (FNBE, 2016, p. 19). According to the authorities, "pupils are guided to consider cultural diversity a fundamentally positive resource" (FNBE, 2016, p. 12).

Features of the FNCC that support these commitments are design principles that contribute to high-quality, equitable delivery, expressed as *Basic education as the foundation of*

general knowledge and ability, Special questions of language and culture, Bilingual education and The significance of local curricula and the local curriculum process. The flexibility of the curriculum to meet local needs is seen in the guiding section on *Principles that inform the preparation of the local curriculum*, enabling the inclusion of Sámi culture. Acknowledgement of the students' cultural identity is seen in the statement that the "curriculum shall be adopted separately for education given in Finnish, Swedish and Sámi languages and in other languages where needed" (FNBE, 2016, p. 11).

Each level of schooling (Grades 1-2, 3-6 and 7-9) features the subject *Mother tongue and literature*, which provides a syllabus detailing the "objectives, contents and assessment of pupils' learning in the instruction in the Sámi language complementing basic education" (FNBE, 2016, p. 530).

Another key feature of the Finnish curriculum is plurilingualism, explained as follows:

School work may include multilingual teaching situations where the teachers and pupils use all languages they know. The knowledge that the pupils and their guardians and communities have of the nature, ways of living, history, languages and cultures in their own linguistic and cultural areas are drawn upon in the instruction. Cultural multiliteracy can be strengthened by means of media education and by taking the media culture of the pupils and their families into account (FNBE, 2016, p. 116).

The flexibility of the curriculum in terms of responsiveness to student diversity is also seen in the second national language curriculum:

The pupils are guided to become aware of the multi-layered linguistic and cultural identities they and others have. The significance of minority languages and endangered languages is also discussed in teaching and learning. Teaching and learning support the plurilingualism of pupils by utilising all languages, including those used by pupils in their leisure time. (FNBE, 2016, p. 169).

Such an approach reinforces students' trust in their own language learning abilities (FNBE, 2016), encouraging them to use their skills in language confidently. A precondition for language education is an integrative approach to the academic disciplines and the opportunity for teachers to localise delivery of the curriculum, supporting the maintenance of identity and culture.

Appendix 1 of the FNCC includes a 10-page statement regarding *The objectives, contents, and assessment of the pupil's learning in the instruction in the Sámi language complementing basic education*, as follows:

Under the Constitution of Finland, each person living in Finland has the right to maintain and develop their own language and culture. All pupils outside the Sámi homeland who speak the Sámi language as their mother tongue or as one of their family's languages may take part in the instruction in the Sámi language complementing basic education and provided under separate funding... Instruction in the Sámi language is implemented in cooperation with other language subjects and other school subjects. The task of joint language education is to increase the pupils' understanding of the significance of a linguistic and cultural background for the individual, the community, and society as well as to guide them to appreciate the Sámi language and other languages (FNBE, 2016, p. 530).

Of the FNCC’s seven Transversal Competences, T2 (*cultural competence, interaction, and self-expression*) resonates most clearly with the AC’s Aboriginal and Torres Strait Islander priority, although it is not specific to Sámi histories and cultures.

Preconditions for a culturally sustainable way of living and acting in diverse environment are possessing cultural competence based on respect for human rights, skills in appreciative interaction ... pupils learn to know and appreciate their living environment and its cultural heritage ... education supports the pupils’ development as versatile and skillful users of language, both in their mother tongue and in other languages ... it is equally important to learn to use mathematical symbols, images and other visual expression, drama and music, and movement as means of interaction and expression (FNBE, 2016, p. 25).

With regard to students who identify as Sámi, the FNCC states that “in order to safeguard the rights of the Sámi people, the UN Declaration on the Rights of Indigenous Peoples is also accounted for” (FNBE, 2016, pp. 16-17). Further, the intention is that students living in the Sámi homeland who are proficient in the Sámi language will be primarily taught in Sámi. Although relatively few students will study Sámi language and literature, the focus on bilingual education lays “a foundation for lifelong learning of languages and appreciation of linguistic and cultural diversity” (FNBE, 2016, p. 122).

Measurement of Curriculum: Breadth, Depth and Rigour

	BREADTH			DEPTH			RIGOUR		
	Limited	Fundamental	Comprehensive	Limited	Fundamental	Challenging	Limited	Moderate	Challenging
AC									
FNCC									

AC – Breadth

Breadth: Limited

The AC states that the cross-curriculum priority should cut across all areas of the curriculum and “enable the delivery of learning area content at the same time as developing knowledge, understanding and skills relating to Aboriginal and Torres Strait Islander Histories and Cultures, Asia and Australia’s Engagement with Asia, and/or Sustainability” (ACARA, 2016). The breadth is deemed to be **limited** as content descriptions are provided in just three learning areas in Years 2, 6 and 10; that is, they are found in HASS (Year 2 x 1, Year 6 x 1, Year 10 x 6), Languages (Year 2 x 1, Year 6 x 0, Year 9/10 x 1), and The Arts (Year F-2 x 6, Year 5-6 x 6, Year 10 x 9).

The cross-curriculum priority features strongly in the Framework for Aboriginal Languages and Torres Strait Islander Languages, located within the AC’s Languages learning area.

FNCC – Breadth

Breadth: Fundamental

With an emphasis on languages, the consistent thread of cultural diversity, and a focus on cultural competency as a transversal skill through all year levels, the breadth of this aspect of the curriculum is regarded as **fundamental**. Delivery of this material is enhanced by the

emphasis on localising curriculum, especially where educators teach the curriculum in the most relevant language, including catering for the Sámi people.

AC – Depth

Depth: Limited

The Aboriginal and Torres Strait Islander Histories and Cultures material is found in **limited** depth in the learning areas. While there is greater representation in the content elaborations, especially in HASS, Languages and The Arts, the material is not connected to the three key concepts of the CCP nor to the nine Organising Ideas.

FNCC – Depth

Depth: Challenging

The depth of the FNCC is considered to be **challenging** because of the localised and flexible approach to curriculum and issues. The Transversal Competence relating to cultural competence for each set of year levels provides considerable depth. Each of the grade levels describes *Mother tongue and literature* and, within this, Sámi language and literature are made explicit by detailing the specific task of the syllabus with a table outlining objectives of instruction, content areas related to the objectives and the transversal competences.

AC – Rigour

Rigour: Moderate

Within the learning areas of the AC, the CCP provides teachers with important content to teach. This content, coupled with the CCP's Key Ideas and associated Organising Ideas, helps teachers to understand the intention and importance of the priority. However, jurisdictional feedback for 2017 (prior to the publication of eight illustrations of practice) indicated that there were 'limited' resources on the AC website to support the 'usefulness' of the priority. Feedback from the Department of Education, Queensland also indicated a concern that the three priorities "are unevenly represented across the learning areas" and Independent Schools, Queensland stated that there is a need for teachers to see how they can make links across the three dimensions of the AC (as cited in ACARA, 2018). Therefore, the CCP can be considered **moderate** in relation to rigour.

FNCC – Rigour

Rigour: Challenging

The rigour of the FNCC is considered to be **challenging**, particularly through *Mother tongue and literature*. An example is found in the *Objective of instruction in the syllabus in Sámi language and literature in Grades 7-9*, which describes content relating to "acting in interactive situations, interpreting texts, and producing texts whereby students learn to recognise and interpret metaphors and symbols in the Sámi language".

Another example is in Grades 1-2, where teachers and other stakeholders are advised that "Stimuli from the Sámi culture are offered to serve as a basis for the pupil's own stories and texts" (FNBE, 2016, p. 153).

Comparative Analysis

With under 6% of the population born elsewhere, and low numbers of Indigenous citizens, Finland is regarded as an ethnically homogenous country. However, as highlighted in other sections of this comparative study, the FNCC has a strong focus on plurilingualism.

Recognition of the diverse nature and needs of the student population is evidenced by the FNCC statement that “the curriculum shall be adopted separately for education given in the Finnish, Swedish and Sámi languages and in other languages, where needed” (FNBE, 2016, p. 11). Such options are not specified in the AC, although any learning area or other dimension of the curriculum could be delivered in another language, as appropriate to meet the needs of students. For example, students whose first language is not English might be taught Mathematics by speakers of their language, alongside their early acquisition of English, if the option were available.

The FNCC safeguards the rights of the Sámi people through accountability to the UN Declaration of the Rights of Indigenous Peoples and commitment to key treaties such as the *International Covenant on Economic, Social and Culture Rights*. There is no mention of these documents as informing the development of the AC, although some references are included in learning area content.

The comprehensive package that makes up the *National Core Curriculum for Basic Education 2014* in Finland includes supporting information to help educators understand and apply the various aspects of the curriculum that are inclusive of Indigenous culture, language and knowledge. The AC contains few corresponding examples, apart from the addition in 2017 of illustrations of practice that specifically support the teaching of the cross-curriculum priority.

The inclusion of Sámi language and literature is evident at all Grade levels, with accompanying resources supporting teaching and assessment of the Sámi language as a complement to basic education. In relation to Aboriginal and Torres Strait Islander Histories and Cultures, the AC offers a limited number of relevant content descriptions in the Learning Areas, makes no specific reference to the priority within the General Capabilities and no reference is found in the Achievement Standards. As an elective, the Aboriginal Languages and Torres Strait Islander Languages Framework in the AC is flexible in design and caters for different language pathways.

A comparison of the AC’s Intercultural Understanding learning continuum (General Capabilities) and the FNCC’s Cultural Competence, Interaction and Self-expression (Transversal Competences) suggests that the latter has greater breadth, depth and rigour. Further, the FNCC is considered to be a highly culturally responsive curriculum in the way it addresses equity and the development of cultural competency in students.

Cultural sustainability: A focus on Mathematics in the Australian Curriculum and Finland’s National Core Curriculum

This section considers the ways in which the Australian and Finnish curricula focus on cultural identity through the subject of Mathematics.

In the AC, Mathematics is designed with three strands, key ideas or proficiency strands, content descriptions (25 for Year 2; 27 for Year 6; 25 for Year 10) and content elaborations. The elaborations are not mandatory but provide further exemplification of the content. Background information is provided in the section *Understand how Mathematics works*, including a rationale, aims, key ideas, structure, a set of PDF documents and a glossary. Two paragraphs make up the Achievement Standard for each year level, describing the knowledge and skills to be taught. In the overview of the cross-curriculum priority, the AC explains that:

Students can explore connections between representations of number and pattern and how they relate to aspects of counting and relationships of Aboriginal and Torres Strait Islander cultures. Students can investigate time, place, relationships and measurement concepts within Aboriginal and Torres Strait Islander contexts. Through the application and evaluation of statistical data, students can deepen their understanding of the lives of Aboriginal and Torres Strait Islander Peoples. (ACARA, 2017p).

The statement remains aspirational as AC: M does not contain content descriptions that are inclusive of the priority for students at any year level, nor are any of the descriptions, as yet, tagged with the Intercultural Understanding capability. Effective delivery of the material is also highly dependent on the capacity and knowledge of teachers.

In the FNCC, the design of the Mathematics curriculum incorporates guidance on *Task of the subject; Objectives on instruction in mathematics* in the relevant Grades; *Key content areas related to the objectives of mathematics; Objectives related to the learning environments and working methods of mathematics; Guidance, differentiation, and support in mathematics; and Assessment of the pupil's learning in mathematics*.

Equally, the FNCC contains little specific mention of Sámi culture. In Grade 2, there are 12 objectives of instruction. Of these, one connects with Transversal Competency 2 (T2). In Grade 6, there are 14 objectives of instruction and just one connects with T2. As with Grades 2 and 6, in Grade 9 there is one Objective of instruction inclusive of T2 out of a total of 20. However, given the nature of the curriculum, it is possible that Sámi culture may be integrated more strongly through, for example, teaching Mathematics in the Sámi language.

j) Student Diversity

Comparative Curricula

Australian Curriculum: Student Diversity

Version 8.3, 2016

British Columbia Curriculum: Support for Learning [and School Attendance] in Basic Education

Version 2016:5, 2014

Year/Grade Level

AC: All year levels

FNCC: All grade levels

Learning Area/Subject

Australian Curriculum: Student Diversity

Finnish National Core Curriculum: Support for Learning [and School Attendance] in Basic Education

Expectations: Knowledge and Skills

Guided by the Melbourne Declaration (2008), the development of the AC was based on the premise that “All students are entitled to rigorous, relevant and engaging learning programs drawn from a challenging curriculum that addresses their individual learning needs” (ACARA, 2017q). AC “sets the expectations for what all young Australians should be taught, regardless of where they live in Australia or their background” (ACARA, 2017r).

Consideration of accessibility to the AC for all students is informed by a range of legislation, including the Disability Discrimination Act (1992) which led to the Disability Standards for Education (2005) (Australian Government Department of Education and Training).

Designed to be inclusive of all students, the AC’s three-dimensional design encompasses eight learning areas, seven general capabilities and three cross-curriculum priorities, giving teachers the flexibility to cater for student diversity by personalising learning. Teachers can address individual learning needs by incorporating specific teaching of the general capabilities or cross-curriculum priorities through the learning area content; all decisions regarding personalised learning are based on assessment of a student’s current levels of learning, strengths, goals and interests.

The AC is written for teachers and provides explicit advice about the use of the general capabilities and the cross-curriculum priorities to teach aspects of learning area content to students with diverse needs. In addition to general advice, more specific advice is provided to assist the learning of students with disability, students identified as gifted and talented, and students for whom English is an additional language or dialect (EAL/D). Illustrations of practice and other materials support teachers in their work.

The process for designing teaching and learning programs is the same for all students. As a starting point, teachers utilise the AC learning area content aligned to the student’s chronological age. Teachers personalise programs by:

- drawing from learning area content at different levels along the Foundation to Year 10 sequence to personalise age-equivalent learning area content

- using the general capabilities and/or cross-curriculum priorities to adjust the learning focus of the age-equivalent learning area content
- aligning individual learning goals with age-equivalent learning area content.

Teachers assess students' progress through the AC in relation to the achievement standards. Some students' progress will be assessed in relation to their individual learning goals; that is, an individual learning program may be designed by a school to ensure that a student can access relevant aspects of the AC.

In Australia, state and territory education authorities carry responsibility for schools and teachers and for the delivery of the AC. Thus, approaches to assessment and reporting differ across the states and territories, as do the methods of catering for students with diverse needs.

The FNCC reflects an official commitment to national unity, equity and the basic right to education. According to the European Commission (2014), one of the basic principles of Finnish education "is that all people must have equal access to high-quality education and training. The same opportunities to education should be available to all citizens irrespective of their ethnic origin, age, wealth or where they live - this has traditionally been a basic value in Finland" (European Commission, 2017). As a result of a reformed curriculum in 1985, the practice of streaming students on the basis of academic ability was replaced with a focus on individual student needs.

Under the Basic Education 2010 Act [Section 17(1)], special support is explained as special needs education and any other support needed by a student, with the emphasis on a coherent strategy. The European Agency for Special Needs and Inclusive Education notes that Finland specifies the provision of special support for "pupils who otherwise cannot adequately achieve the goals set for their growth, development or learning" (European Agency for Special Needs and Inclusive Education, 2017) and is available in general or extended compulsory education. Special support is designed to give students *holistic* and *methodical* assistance to enable satisfactory completion of basic compulsory education and preparation for post-basic education. It is organised by subject, using the general syllabus or an individualised syllabus, or by activity areas.

Support for students with disability

Advice materials for schools and teachers regarding the support of students with disability are incorporated in FNCC, Section 7. Three levels of support are identified:

- general support
- intensified support
- special support.

There is no clear description of how students are selected and/or assessed to access these levels of support.

General support

General support is a first response strategy to meeting a student's needs. At this level, "learning difficulties and problems with school attendance are prevented by such means as

differentiation of instruction, cooperation between teachers and with other staff, guidance and flexible modifying of teaching groups” (FNBE, 2016, p. 83). This requires individual pedagogical solutions, guidance, and support measures which seek to improve the situation at an early stage and within the daily school routine. An individualised education plan (IEP) may be used as part of general support, if necessary, and is based on access to the FNCC at the same level as other students.

No detailed advice material is provided in the curriculum document to guide teachers in differentiating the curriculum as part of the general support response strategy.

Intensified support

Intensified support is prescribed for a student who “needs regular support in learning or school attendance or several support forms simultaneously” (FNBE, 2016, p. 84). Intensified support is provided “as part of mainstream education using flexible teaching arrangements” (FNBE, 2016, p. 84).

All students receiving intensified support have an IEP. The IEP is a written plan based on the curriculum specifying the objectives of the student’s learning and school attendance, the necessary teaching arrangements and the support and guidance needed by the student. This is based on access to the FNCC at the same level as other students.

Curriculum materials provide some information on IEP development and pedagogical solutions but little guidance on how to differentiate the curriculum.

Special Support

Special support is the highest level of support and is for students “who otherwise cannot adequately achieve the goals set for their growth, development or learning”. All students receiving special support have an IEP. The program of study is arranged either by subjects from the FNCC or by activity areas. If the former applies, “he or she studies these subjects according either to the general syllabus or an individualised syllabus” (FNBE, 2016, p. 88).

There is some specific advice around individualisation of the syllabus and how students can be exempted from subjects.

According to the FNCC, the individualisation of the syllabus for a subject means that “the achievement level for the pupil’s learning is set to match his or her capabilities” (Teachers assess students’ progress through the AC in relation to the achievement standards. Some students’ progress will be assessed in relation to their individual learning goals; that is, an individual learning program may be designed by a school to ensure that a student can access relevant aspects of the AC).

The advice is general around differentiation of the curriculum. The main objective is “to support the pupil’s studies so that the objectives conforming to the general syllabus can be attained in all subjects” (FNBE, 2016, p. 92). There is no specific advice or examples of how to individualise the curriculum. Students can be exempt from studying subjects under extenuating circumstances. Other arrangements are made for these students.

Learning for students with the most severe developmental disabilities may occur through a functional approach in activity areas rather than through the study of academic subjects.

Activity areas are accessed only when “the pupil is found unable to study according to the individual syllabi of subjects” (FNBE, 2016, p. 94). The activity areas identify motor skills, language and communication, social skills, skills in activities of daily living, and cognitive skills. The activity areas may include “some objectives and contents of individual subjects if the student has strengths relevant to the subject. Assessment is usually based on the activity areas. The assessment is always verbal” (FNBE, 2016, p. 96).

There is limited guidance on what each activity area involves. No set curriculum material is available for the activity areas.

In addition to mainstream schools, there are six Valteri Centres in the Finnish system throughout Finland (FNBE, 2017). These centres offer allied health services, teacher professional learning and resource materials to mainstream schools in their area to support teachers of students with a disability. There is also an on-site special school option. Students are referred to a Valteri Centre by the local municipality after a support period, during which assessments of the student's needs are undertaken. If support strategies cannot be arranged in the student's home municipality during the support period, the student can be temporarily admitted as a Valteri school student. Decisions on support for the student are made in collaboration with the municipality and the parents/carers.

Gifted and Talented Students

While the FNCC provides for a full range of services and advice for meeting the special education needs of students, there is limited advice relating to gifted and talented students. Advice for teachers on how to meet the needs of these students is not evident in the Finnish curriculum. However, there is a strong culture of personalising the learning to meet the needs of every student and it seems clear that the expectation is that teachers know how to differentiate the learning. Most students attend mainstream classes. However, according to Kauppinen, Director of the FNBE, there are some specialist schools, such as those with a focus on Mathematics, sport and language (Personal communication, August 16, 2017).

Bilingualism and Plurilingualism

The benefits of bilingualism and plurilingualism are strongly embraced and clearly detailed in the FNCC. According to the Basic Education Act, the language of instruction starts with the student's mother tongue which may be Finnish, Swedish, Sami, Roma or Sign language. In addition, students must learn the first and/or second national language (Finnish or Swedish).

For sign language users, the syllabus in Finnish is intended for pupils who study sign language and literature in schools where the language of instruction is Finnish.

The task of instruction is to support the pupil's growth towards a high level of bilingualism and to provide the prerequisites for the pupil to achieve the skills required for further studies in both languages and to function as an equal member of Finnish-language and sign language communities. The local curriculum is prepared and the objectives of instruction are defined by applying the syllabus in Finnish language and literature and/or the syllabus in Finnish as a second language and literature. (FNBE, 2016, p. 247).

Finnish as a Second Language

The main goal of the syllabus in *Finnish as a second language and Finnish literature* is “to

support the development of the pupil's plurilingualism and to awaken the pupil's interest in lifelong development of language proficiency and to provide the necessary tools". By securing "cooperation with the guardians, the instruction of the pupil's own mother tongue, and other subjects, the teaching and learning of Finnish as a second language and Finnish literature helps the pupil in building his or her linguistic and cultural identity in a culturally diverse and multimedial society". (FNBE, 2016, p. 237). The curriculum document details:

- general guidance for schools and teachers
- objectives of instruction in the syllabus in Finnish as a second language and literature in Grades 3–6
- key content areas related to the objectives of the syllabus in Finnish as a second language and literature in Grades 3–6
- assessment criteria for the syllabus in Finnish as a second language and literature at the end of Grade 6 for a verbal assessment describing good knowledge and skills/numerical Grade 8.

There is similar guidance for Swedish as a second language.

Comparative Analysis

Both the AC and the FNCC are intended to be inclusive of all students. The following similarities are identified:

- decisions on how the curriculum is implemented to meet the diverse needs of students are made at the local level
- there is a robust approach to personalising student learning to meet the needs of the student; this may occur in one or more subject areas. There is an expectation that teachers make appropriate adjustments for all students including gifted and talented and students with disability and learning
- parents and students are part of the decisions informing learning goals and required adjustments (curriculum, assessment, instruction and environmental)
- most students attend mainstream classes. There are some specialist schools including those with a focus on specific subjects such as Mathematics, sport, language and special needs.

The AC provides more comprehensive guidance and support to teachers in meeting the needs of students with diverse learning needs than does the Finnish curriculum. Resources and advice materials available on the AC website support teachers to provide relevant and engaging programs that can be personalised to meet individual learning needs. There is general advice on planning teaching and learning programs on students' diversity and specific advice that builds on this general advice for:

- students with disability
- gifted and talented students
- students for whom English is an additional language or dialect (EAL/D).

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5 LIST OF TABLES

Table 1. 1	<i>Subject areas by country</i>	9
Table 2. 1	<i>Key population measures</i>	17
Table 2. 2	<i>Key economic measures</i>	18
Table 2. 3	<i>Key teaching measures</i>	20
Table 2. 4	<i>Employment by highest educational attainment</i>	25
Table 2. 5	<i>Performance in Science Literacy (PISA 2015)</i>	27
Table 2. 6	<i>Performance in Reading Literacy (PISA 2015)</i>	28
Table 2. 7	<i>Performance in Mathematics Literacy (PISA 2015)</i>	29
Table 2. 8	<i>Score difference in performance in Australia (PISA 2015)</i>	30
Table 3. 1	<i>Subjects by Depth: Challenging</i>	43
Table 3. 2	<i>Subjects by Depth: Fundamental</i>	44
Table 3. 3	<i>Subjects by Rigour: Challenging</i>	45
Table 3. 4	<i>Subjects by Rigour: Moderate</i>	45
Table 3. 5	<i>General Capabilities Matched to Transversal Competences</i>	46
Table 3. 6	<i>Number of content descriptions in AC: M, Year 2</i>	64
Table 3. 7	<i>Number of content descriptions in AC: M, Year 6</i>	70
Table 3. 8	<i>Number of content descriptions in AC: M, Year 10</i>	77
Table 3. 9	<i>AC-FNCC Comparison of Year 1-2 Science topics by discipline</i>	85
Table 3. 10	<i>AC-FNCC Comparison of Year 3-6 Science topics by discipline</i>	90
Table 3. 11	<i>Number of content descriptions in AC: HASS, Year 6</i>	100
Table 3. 12	<i>Number of content descriptions in FNCC: H, FNCC: SS, FNCC:ES, Grade 3-6</i>	101
Table 3. 13	<i>Number of references to transversal competences in FNCC: H, FNCC: SS, FNCC: ES, Grade 3-6</i>	103
Table 3. 14	<i>Number of content descriptions in AC: H, AC: G, AC: CC, AC: EB, Year 10</i> ..	108
Table 3. 15	<i>Number of content descriptions in FNCC: H, FNCC: SS, FNCC: G, Grade 7-9</i>	109
Table 3. 16	<i>Number of references to transversal competences in FNCC: G, FNCC: H, FNCC: SS, Grade 7-9</i>	110
Table 3. 17	<i>Distribution of content descriptions and elaborations across strands for AC, Year 2</i>	116
Table 3. 18	<i>Quantitative comparison of content from AC, Year 2 and FNCC, Grade 2</i>	118
Table 3. 19	<i>Distribution of content descriptions and elaborations across strands for Year 6</i>	123
Table 3. 20	<i>Quantitative comparison of content from AC, Year 6 and FNCC, Grade 6</i>	125
Table 3. 21	<i>Distribution of content descriptions and elaborations across strands for AC, Year 10</i>	129
Table 3. 22	<i>Alignment of AC Technologies subjects and contexts to FNCC subjects</i>	131
Table 3. 23	<i>Quantitative comparison of content from AC, Year 10 and FNCC, Grade 9</i> ...	132
Table 3. 24	<i>Number of content descriptions in AC: L, Year 6 (Communicating)</i>	152
Table 3. 25	<i>Number of content descriptions in AC: L, Year 6, (Understanding)</i>	152
Table 3. 26	<i>Coverage of FNCC: English as a Foreign Language, Grade 3-6</i>	153
Table 3. 27	<i>Number of content descriptions in AC: L, Year 10 (Communicating)</i>	158

Table 3. 28 <i>Number of content descriptions in AC: L, Year 10 (Understanding)</i>	158
Table 3. 29 <i>Coverage of FNCC: English as a Foreign Language, Grade 6</i>	159
Table 3. 30 <i>AC: Count of capabilities and General Capabilities continua for Year 6</i>	174
Table 3. 31 <i>AC: Count of capabilities in the General Capabilities continua for Year 10</i>	178
Table 3. 32 <i>AC: General Capabilities at Level 6</i>	180
Table 3. 33 <i>Finnish Basic Education transversal competences at Year 10</i>	181
Table 3. 34 <i>AC/FNCC approaches to personal safety and care</i>	182
Table 3. 35 <i>AC/FNCC approaches to global perspectives</i>	183

6 LIST OF FIGURES

<i>Figure 1. 1</i> Webb's Depth of Knowledge (1997).....	13
<i>Figure 2. 1</i> Percentage of GDP spent on education	18
<i>Figure 2. 2</i> Salary of experienced teachers	20
<i>Figure 2. 3</i> Percentage of principals by age.....	21
<i>Figure 2. 4</i> Country of birth (Australia)	22
<i>Figure 2. 5</i> Population by Language (Finland)	23
<i>Figure 2. 6</i> Highest educational attainment (25-64 years of age)	24
<i>Figure 2. 7</i> Tertiary study (adults aged 25-64)	24
<i>Figure 2. 8</i> Science Literacy: Proficiency scales	27
<i>Figure 2. 9</i> Reading Literacy: Proficiency scales.....	28
<i>Figure 2. 10</i> Mathematics Literacy: Proficiency scales	29
<i>Figure 2. 11</i> Education System in Finland	32
<i>Figure 2. 12</i> The Australian Curriculum 'cube'	39
<i>Figure 3. 1</i> Australian Curriculum by subject and student grouping.....	48
<i>Figure 3. 2</i> Finnish National Core Curriculum by subject and year group	48
<i>Figure 3. 3</i> General Capabilities.....	167

7 LIST OF ABBREVIATIONS

ABS	Australian Bureau of Statistics
AC	Australian Curriculum
AC: CC	Australian Curriculum: Civics and Citizenship
AC: CCP	Australian Curriculum: Cross-Curriculum Priority
AC: DT	Australian Curriculum: Design and Technology
AC: E	Australian Curriculum: English
AC: EB	Australian Curriculum: Economics and Business
AC: G	Australian Curriculum: Geography
AC: GC	Australian Curriculum: General Capabilities
AC: HASS	Australian Curriculum: Humanities and Social Sciences
AC: H	Australian Curriculum: History
AC: HPE	Australian Curriculum: Health and Physical Education
AC: L	Australian Curriculum: Languages
AC: M	Australian Curriculum: Mathematics
AC: S	Australian Curriculum: Science
AC: T	Australian Curriculum: Technologies
AC: TA	Australian Curriculum: The Arts
ACARA	Australian Curriculum, Assessment and Reporting Authority
ACER	Australian Council for Educational Research
ACS	Australian Computer Society
AGDET	Australian Government Department of Education and Training
AITSL	Australian Institute for Teaching School Leadership
CCP	Cross-Curriculum Priority
CD	Content Descriptions
COAG	Council of Australian Governments
CPR	Cardiopulmonary Resuscitation
DoK	Depth of Knowledge
EAL/D	English is an Additional Language or Dialect

ESL	English as a Second Language
FNAE	Finnish National Agency for Education
FNBE	Finnish National Board of Education
FNCC	Finnish National Core Curriculum
FNCC: B	Finnish National Core Curriculum: Biology
FNCC: C	Finnish National Core Curriculum: Crafts
FNCC: Ch	Finnish National Core Curriculum: Chemistry
FNCC: ES	Finnish National Core Curriculum: Environmental Studies
FNCC: FL	Finnish National Core Curriculum: Foreign Languages
FNCC: G	Finnish National Core Curriculum: Geography
FNCC: H	Finnish National Core Curriculum: History
FNCC: HE	Finnish National Core Curriculum: Health Education
FNCC: HEc	Finnish National Core Curriculum: Home Economics
FNCC: M	Finnish National Core Curriculum: Mathematics
FNCC: P	Finnish National Core Curriculum: Physics
FNCC: S	Finnish National Core Curriculum: Science
FNCC: SS	Finnish National Core Curriculum: Social Studies
FNCC: MTL	Finnish National Core Curriculum: Mother Tongue and Literature
FNCC: M/VA	Finnish National Core Curriculum: Music/Visual Arts
FNCC: PE	Finnish National Core Curriculum: Physical Education
FNCC: SHCL	Finnish National Core Curriculum: Sami History, Culture and Language
FNCC: TC	Finnish National Core Curriculum: Transversal Competences
GCN	Global Curriculum Network
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IEP	Individualised Education Plan
KC	Key Concepts
KP	Key Processes
LOTE	Language Other Than English
NAEP	National Assessment of Educational Progress

NAPLAN	National Assessment Program for Literacy and Numeracy
OECD	Organisation for Economic Cooperation and Development
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
SHE	Science as a Human Endeavour
SIS	Science Inquiry Skills
STEM	Science, Technology, Engineering, Mathematics
SU	Science Understanding
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VUCA	Volatile, Uncertain, Complex, Ambiguous
WHO	World Health Organisation

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