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Australian Curriculum, Assessment and Reporting Authority

Curriculum Mapping Project Phase 4a

Comparing Current State and Territory Intended and Enacted Curriculum against the Final Australian Curriculum

Final Report

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Document Tracking

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EXECUTIVE SUMMARY

This paper contains the draft report on phases 4 and 4a of the Curriculum Mapping Project set up by ACARA as part of the development of the Australian Curriculum. Phase 4a involved the mapping of English, but not of other subjects, because of concerns about the data set available for English following Phase 4. The data on the other subjects are unchanged from the Phase 4 reports.

The mapping project involves an analysis of similarities and differences between the Australian Curriculum and current State and Territory curricula in English, Mathematics, Science and History. The data on State and Territory curricula are drawn from both expert mapping of the Australian Curriculum documents in these subjects and equivalent documents provided by each State and Territory; and teacher mapping of their own teaching programs in one or more subjects at one or more year levels in some States and Territories.

This phase of the project also reports on mapping of the final Australian Curriculum against international comparison curricula. The international jurisdictions were not remapped, so the data about those jurisdictions are derived from Phase 4. The jurisdictions selected for international comparison were:

English: Ontario and New Zealand
Mathematics: Singapore and Finland
Science: Ontario and Finland.

The project is designed to provide advice to ACARA in the further development of the Australian Curriculum, to identify areas where teachers may require support in the implementation of the Australian Curriculum and to provide international benchmarks for the development of the Australian Curriculum.

The first, second and third phases of the project were based on mapping of drafts of the Australian Curriculum. Phases 4 and 4a involved mapping of the final Australian Curriculum. The first phase of the project involved curriculum experts nominated by each State and Territory and ACARA mapping draft Australian Curriculum documents and State and Territory documents in English, Mathematics, Science and History. In the second phase, each State and Territory was invited to nominate teachers to participate in a mapping of the enacted curriculum in that jurisdiction. Six jurisdictions accepted the invitation: ACT, New South Wales, Northern Territory, Queensland, Tasmania and Western Australia. Teachers completed surveys for particular subjects at year levels (rather than phase or stage of schooling). Following the completion of the teacher surveys, the results were analysed and combined with the data from the expert surveys to generate a single set of results for each state and territory. For South Australia and Victoria, which did not participate in the teacher mapping, the data in the report were derived from expert mapping only. The third phase involved mapping the September 2010 draft of the Australian Curriculum and curricula from international comparison jurisdictions (see above).

This report concerns Phase 4 and 4a of the project, and includes two elements:

- This report comparing the final Australian Curriculum with curricula in each State and Territory;

- A separate report comparing the final Australian Curriculum with each of the international curricula.

The whole project involved the development of a survey instrument for each subject based on a consistent language for describing the subject, including:

- a language for describing the knowledge base; and
- a language for describing the 'cognitive demand' of each area, consisting of descriptions of what students can do with particular knowledge.

The survey instrument requires those completing the survey to respond on a matrix to indicate whether a curriculum framework or teaching program being considered:

- includes a specific topic;
- if so, to what extent; and
- at what level of cognitive demand students are expected to operate in relation to that topic.

The methodology has been consistent throughout each phase of the project.

Phase 4 mapping

The phase 4 and 4a mapping follows on directly from phase 3 mapping. For the third phase of the project, curriculum experts from States and Territories and ACARA took part in the mapping process. They were brought together in Sydney on 21-22 September, 2010. They were provided with a briefing including the background to the project, and a training session in completing the surveys. The project consultants worked with them to respond to questions and provide advice on the completion of the survey. Each rater was asked to map the Australian Curriculum and two international curricula in the same subject. The data arising from the surveys were then analysed, compared with earlier data on State and Territory curricula and compiled into a draft report. For State and Territory documents, the data developed in the first two phases of the project were used in the report of the third phase: because the documents had not changed, further mapping was not required. Appendix 2 outlines the steps involved in the analysis.

The fourth phase involved remapping the Australian Curriculum following revisions undertaken to the September draft. Raters involved in phase 3 were asked to undertake a further mapping of the curriculum as at 12 November to ensure that the ratings reflected recent changes to the documents. This occurred in the period 12-21 November. On this occasion, raters were not brought together, since they had been trained and supported in the phase 3 mapping. Instead, mapping was undertaken online, using the site developed by Education Services Australia. No further mapping of State and Territory documents was required.

Phase 4a involved a repeat mapping of the final English curriculum (but not the other subjects). On this occasion a mostly new and enlarged group of raters was brought together in Sydney on 7 June 2011 and provided with a training session and the opportunity to work together and moderate their results. Most raters continued the work during the following days, and the final rater data became available on 17 June 2011.

This report is the result of comparing phase 4 and 4a mapping of the final Australian Curriculum with data from phase 1 and 2 mapping of State and Territory curricula.

The data from the phase 4 mapping of the Australian Curriculum and the data arising from the phase 3 international mapping were compiled into a separate report.

Findings

English is well aligned with an overall alignment index across all States and Territories of 0.78, which is towards the top of the 'High' range. The two States that did not participate in teacher mapping (Victoria and South Australia) have markedly lower alignment levels than those that did, suggesting that teacher practice is closer to the Australian curriculum than are curriculum frameworks. Apart from South Australia (with an alignment of 0.59), all States and Territories were rated 'High' or 'Very High'. English shows almost complete practical alignment across Australia, with the exception of some topic groups in some States (notably South Australia). Of the 41 phase ratings, only six are ranked below 'High' alignment, all in Victoria and South Australia, which did not take part in teacher mapping. In terms of cognitive demand, the analysis shows two major overall variations between the Australian Curriculum and state and territory curricula. Australian Curriculum is somewhat stronger in 'Analyse/Investigate', and 'Evaluate'. It is somewhat weaker in 'Generate/Create/Demonstrate' and 'Perform procedures/Explain'.

Mathematics, like English, is well-aligned with an overall alignment index of 0.76, which is in the 'High' range. It is notable that all States and Territories are rated 'High' alignment, with ratings between 0.71 and 0.77. Only two phases of the 41 are rated below 'High'. Mathematics shows almost complete practical alignment, including a high level of alignment in all jurisdictions. In the case of cognitive demand, the Australian Curriculum is stronger in 'Solve non-routine problems/make connections' than all jurisdictions, and in all but one the difference is material. The reverse is true in the case of 'Memorise facts/definitions/formulas/fluency', where the Australian Curriculum mostly has a lower level of representation.

The situation in **Science** is somewhat less consistent, with an overall alignment index of 0.66. All States and Territories other than Victoria are rated 'High' or 'Moderate', with Victoria rated 'Low' at 0.51. Victoria has four phases ranked 'Low' and two ranked 'Very low'. This is possibly a result of the absence of teacher mapping data. In Science, it is notable that there are topic groups at most phases that are misaligned. In part, this may be because of the number of different topic groups in Science (29 versus eight in History), which means that jurisdictions cannot cover all groups at all levels, leaving many opportunities for a variation in timing or sequence leading to apparent low alignment. Despite the apparent number of alignment issues, Science remains aligned in the 'Moderate' or 'High' range with all States and Territories with the exception of Victoria. In the case of cognitive demand, the Australian Curriculum is stronger in 'Apply concepts/make connections' than all jurisdictions, and in most cases the difference is material and sometimes very marked. The reverse is true in the case of 'Memorise facts/definitions/formulas/', where the Australian Curriculum mostly has a lower level of representation, and again in most cases the difference is marked.

The **History** data shows similarly moderate level of alignment with an overall alignment index of 0.67, close to the top of the 'Moderate' range. Three jurisdictions are aligned in the 'High' range (NSW, Queensland and Tasmania), while the other five are aligned in the 'Moderate' range. Phase alignments are distributed evenly around

'Moderate'. One phase was rated in the 'Very High' range, 16 rated 'High', 16 rated 'Moderate', seven rated 'Low' and one rated 'Very Low'. The fairly even distribution around the moderate range reinforces the view that alignment levels overall are moderate. In summary, History shows reasonable alignment across Australia, but there remain some areas of weakness. In the case of cognitive demand, there are three broad patterns evident in the data. There is a consistent trend for the States and Territories to have a greater focus on 'Demonstrate/apply understanding'. There is also a trend for the Australian Curriculum to have a substantially stronger focus overall on 'Process information/investigate'. Although it is not consistent, there is a general trend for the Australian Curriculum to have a somewhat stronger focus on 'Recall/memorise'.

The report identifies topic groups in subjects where teachers may need support in implementation.

The data in the report have some weaknesses. Despite training sessions and consultant availability to the curriculum experts and teachers in the completion of the survey, there were inconsistencies in some survey responses. In the phase 1 mapping, surveys completed using the spreadsheet process included responses that did not fit the survey instructions. In the analysis, efforts were made to identify the respondent's intention and in many cases this was possible. The two-step process of using spreadsheets and then uploading the data into the ACARA online curriculum mapping system produced minor changes in the results of the expert mapping during this phase. The data were cleansed again prior to entry, and further improvements were made in the process of loading and generating reports. The process included identification and rectification of data problems in a small number of cases, such as surveys that nominated more than one time on task rating for a topic and mistakes in rating cognitive demand. There remain, however, some cases where the intention was not clear on one or more lines of the survey, and in these cases the data have been eliminated from the analysis. Later phases of the project, using the online system, were less subject to such inconsistencies, but it is important to remember that the data arise from expert judgment about curriculum and may be subject to errors of rater interpretation.

Introduction

This paper contains the final report on the Phases 4 and 4a of the Curriculum Mapping Project set up by ACARA. The Curriculum Mapping project is part of the development of the Australian Curriculum. The project involves an analysis of similarities and differences between the Australian Curriculum and current State and Territory curricula[1] in English, Mathematics, Science and History. The data on State and Territory curricula are drawn from two sources:

- expert mapping of the ACARA curriculum documents in these subjects and equivalent documents provided by each State and Territory; and

- teacher mapping of their own teaching programs in one or more subjects at one or more year levels.

The project has two purposes:

- to provide advice to ACARA on the extent to which the Australian Curriculum is similar to or different from curricula in each State and Territory, as feedback to the further development of the Australian Curriculum; and

- to provide advice on those areas of the Australian Curriculum which are different from current curricula, and in which teachers may require support to assist in incorporating them within their teaching programs.

The project involved the development of a consistent language for describing each subject addressed in the project, based on a 'uniform language' developed by Porter and colleagues (see Appendix 1 for further information on the source methodology). This includes:

- a language for describing in detail the knowledge base in each of English, Science, History and Mathematics. This consists of lists of topics arranged in broad content categories in each subject domain. In English, for example, the topic group of 'Language Study' includes topics such as 'spelling' and 'effects of race, gender or ethnicity on language and language use'. In Science, 'ecosystems' and 'adaptation and variation' appear as topics within 'Ecology'. The lists of topics are intended to be complete and universal, so that they could be used to describe any curriculum in the relevant domain, regardless of year level, context or level of complexity; and

- a language for describing the 'cognitive demand' of each area, based on a hierarchy of performance expectations. This consists of descriptions of what students can do with particular knowledge. These descriptions are different for each learning area, though they are based on a similar hierarchy of demands consisting of five levels in categories like the following:
  - memory and recall
  - performing procedures
  - communicating, demonstrating, explaining, creating

[1] Readers should note that when this report refers to State and Territory curricula, unless the context indicates otherwise the term refers to a combination of the intended curriculum represented in curriculum documents (and mapped in the expert mapping process) and the enacted curriculum represented in what happens in classrooms as reported by teachers in the mapping process.

- analysis, argument and investigation
- evaluation and application in different contexts

A survey instrument was then developed for each subject, based on this 'uniform language'. The survey instrument was used by expert respondents to describe an official curriculum document, and by teachers to describe their teaching programs. The survey instrument requires those completing the survey to respond on a matrix to indicate whether a curriculum framework or teaching program being considered:

- includes a specific topic;
- if so, to what extent; and
- at what level of cognitive demand students are expected to operate in relation to that topic.

The first phase of the project involved curriculum experts nominated by each State and Territory and ACARA to take part in mapping curriculum documents. Those nominated were brought together in Sydney from 8-10 March, 2010. They were provided with a briefing including the background to the project, and a training session in completing the surveys. The project consultants worked with them to respond to questions and provide advice on the completion of the survey. These surveys were completed using a spreadsheet and later uploaded into the ACARA online curriculum mapping system.

Each State or Territory document was rated by the experts nominated by that jurisdiction and by those nominated by one other State or Territory or ACARA. Documents were sourced through a request from ACARA for each system to provide curriculum documents appropriate to the task. Those provided by each system were as follows:

Source of curriculum document	**Documents used**
ACT	The complete *Every Chance to Learn: Curriculum framework for ACT schools Preschool to year 10* for Early Childhood, Later Childhood, Early Adolescence and Later Adolescence.
New South Wales	The *K-6 Syllabus* and *Years 7-10 Syllabus* in each subject or learning area, the *Science and technology K-6 outcomes and indicators*, and the *NSW Primary Curriculum Foundation Statements*.
Northern Territory	Relevant sections from the *Northern Territory Curriculum Framework*, including the 'EsseNTial Learnings' section and the 'Introduction', 'Key Growth Points' and full description of each strand for each subject.
Queensland	The *Early Years Curriculum Guidelines* and *Phase Descriptors*, the information statement about Standards, and the *Standards* document, Essential Learnings statements for Years 3, 5, 7 and 9 in each subject or learning area, and the *Year 10 Guidelines*, 'Year 10 Guidelines Overview' and Year 10 learning area statements for each of the four subjects.
South Australia	Documents from the *South Australian Curriculum, Standards and Accountability Framework* and its Companion Documents, and including strand statements and standards

	for all levels in each of the four subjects and the Companion Document *SACSA: The Required Elements*.
Tasmania	Sections from *The Tasmanian Curriculum* including the K-10 syllabus and support materials for each of the four subjects.
Victoria	The complete *Victorian Essential Learning Standards* for all levels and areas of the curriculum including Physical, Personal and Social Learning, Discipline-based Learning and Interdisciplinary Learning.
Western Australia	The complete *Curriculum Framework for Kindergarten to Year 12 Education in Western Australia,* the Learning Area Statements, Overview and Scope and Sequence for all four subjects.
ACARA	The subject 'Organisation' section, 'Content statements', 'Elaborations and 'Achievement standards' for each of the four subjects in the consultation version of the Australian Curriculum as at 8 March 2010.

The data arising from the expert surveys were then analysed and compiled into an interim report.

In the second phase of the project, each State and Territory was invited to nominate teachers to participate in a mapping of the enacted curriculum in that jurisdiction. Six jurisdictions accepted the invitation: ACT, New South Wales, Northern Territory, Queensland, Tasmania and Western Australia. Teachers nominated were provided with a briefing including the background to the project, and a training session in completing the surveys. This work occurred between 17 May and 4 June, 2010. Teachers completed surveys for particular subjects at particular year levels (rather than phase or stage of schooling). States and Territories took different approaches to managing the process. Some brought all their teachers together and had most of the surveys completed during the training session. Others used a combination of on-site and videoconference training. One system engaged teachers mainly by remote means, and relied on teachers to complete the surveys in their own time. Another used a train-the-trainer model, training a smaller number of teachers who then trained their colleagues and supported their survey completion. Project consultants worked with teachers to respond to questions and provide advice on the completion of the survey either face-to-face or by email and telephone. These surveys were completed online using the ACARA online curriculum mapping service. Across Australia, 890 teachers in the six participating States and Territories completed 925 surveys. Some teachers completed more than one survey and a small number of teachers completed several.

Following the completion of the teacher surveys, the results were analysed and combined with the data from the expert surveys to generate a single set of results for each state and territory. Note that for South Australia and Victoria, which did not participate in the teacher mapping, the data in this report are derived from expert mapping only.

Appendix 2 outlines the steps involved in this analysis. It should be noted that despite the training session and consultant availability to the curriculum experts and teachers in the completion of the survey, there were weaknesses and inconsistencies in the survey responses. In a significant number of cases, surveys completed using the spreadsheet process included responses that did not fit the survey instructions. In the

analysis, efforts were made to identify the respondent's intention and in many cases this was possible. The two-step process of using spreadsheets and then uploading the data into the ACARA online curriculum mapping system produced minor changes in the results of the expert mapping during this phase. The data were cleansed again prior to entry, and further improvements were made in the process of loading and generating reports. The process included identification and rectification of data problems in a small number of cases, such as surveys that nominated more than one time on task rating for a topic and mistakes in rating cognitive demand. There remain, however, some cases where the intention was not clear on one or more lines of the survey, and in these cases the data have been eliminated from the analysis.

In the second phase of the mapping process, the teacher mapping, using the online survey site significantly improved the ease of completion of the surveys and the data integrity.

The third phase of the project involved curriculum experts from States and Territories and ACARA in mapping curriculum documents. Those nominated were brought together in Sydney on 21-22 September, 2010. They were provided with a briefing including the background to the project, and a training session in completing the surveys. The project consultants worked with them to respond to questions and provide advice on the completion of the survey. The surveys were completed using the online system developed on behalf of ACARA by Education Services Australia, in a project managed by the project consultants.

The curriculum experts involved in third phase mapping were asked to map three documents each. All participants were asked to map one subject in the final Australian Curriculum as at September 20. In addition, they mapped two international comparison curricula in the same subject. The jurisdictions selected for international comparison were:

English: Ontario and New Zealand
Mathematics: Singapore and Finland
Science: Ontario and Finland.

The fourth phase involved remapping the Australian Curriculum following revisions undertaken to the September draft. Raters involved in phase 3 were asked to undertake a further mapping of the curriculum as at 12 November to ensure that the ratings reflected recent changes to the documents. This mapping process occurred in the period 12-21 November. On this occasion, raters were not brought together, since they had been trained and supported in the phase 3 mapping. Instead, mapping was undertaken online, using the site developed by Education Services Australia. No further mapping of State and Territory documents was required.

Phase 4a involved remapping the Australian English curriculum because of concerns about the data set in English following the Phase 4 mapping. The Phase 4 mapping of English resulted in a low number of raters completing the task. This led to the decision to remap English with a larger number of raters, included dedicated primary and secondary school raters. The process began on 7 June with a training session in Sydney. Raters then undertook the mapping process and were able to moderate their results. Most raters continued the work over subsequent days, completing the work by 17 June at the latest.

This report compares data arising from the phase 4 (mathematics, science and history) and 4a (English) mapping of the final Australian Curriculum with data from phase 1 and 2 mapping of State and Territory curricula.

The present report does not include data on the international comparison curricula. Only the mapping of the final Australian Curriculum is included, along with data from the earlier mapping of the intended and enacted State and Territory curricula.

In considering the findings in the report, it is important to recognize that the underlying data have some weaknesses. This report has already pointed to the presence of data issues arising from the change in technology from spreadsheets to the online system during the project, and from inconsistencies in the way individual raters interpreted survey instructions in some cases. While strenuous efforts were made to remedy these matters, there remain some cases where the rater's intention was not clear, and these data were removed from the report. It is also important to note that the data arise from expert judgment about curriculum and may be subject to errors of rater interpretation.

The reports

This report summarises the key findings of the project. These can be found at pages 17-29, organized by subject. They include, for each subject, a summary of the overall results for the subject across Australia. This is in the form of a table combining the results of the expert mapping and the results of the teacher mapping of their programs for the six States and Territories that participated in teacher mapping. In the case of South Australia and Victoria, the table includes only the results of the expert mapping of curriculum documents, since they did not participate in teacher mapping. The table compares these data with the data arising from the phase 4 or 4a mapping of the final Australian Curriculum. This produces a summary result that is the best measure of the level of alignment between the final Australian Curriculum and the curriculum in the State or Territory.

The table for each subject is accompanied by a brief commentary noting the extent of alignment between the final Australian Curriculum and curriculum documents and teaching programs in each jurisdiction. The report also includes a brief commentary in each subject section on issues affecting specific States and Territories.

In addition, there is a commentary on the relative levels and kinds of cognitive demand evident in the Australian Curriculum and the State or Territory curriculum.

The detailed data supporting the findings can be found in the **attachments to this paper**, which are organized by subject. Within each subject, they include two broad components:

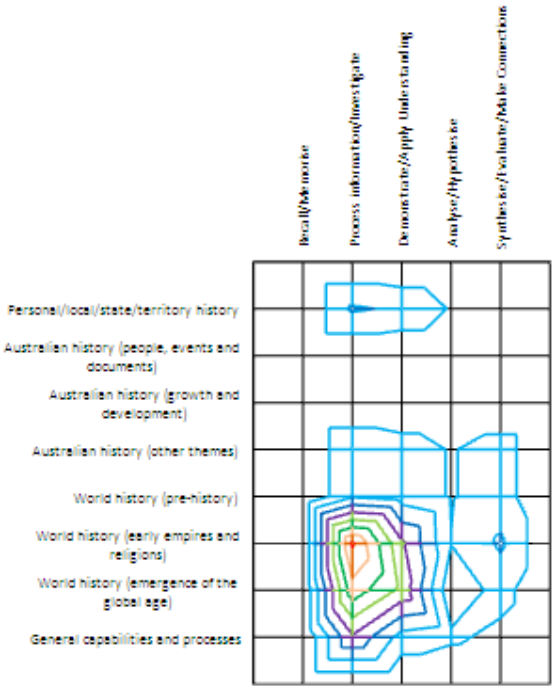
1. The first section contains a set of tables and commentary on the **overall results for the subject across Australia**. This section of the report identifies significant variations, where they exist, between the ratings of the Australian Curriculum in the subject and the ratings for States and Territories in general. Within each subject, the reports are organized by phase or stage of schooling. Because systems in Australia have quite different phase structures, the reports aggregate States and Territories with similar phase structures: all those States or Territories which have a separate P phase, followed by those which have a P-2 phase, then P-3, then 1-2 and so on. The reports identify any implications for likely requirements for support for teachers in the implementation of the Australian Curriculum.

2. The second section provides a more focused account of **the results for each State and Territory compared with results for the Australian Curriculum**, organized by the curriculum phases used in that State or Territory. Within each subject, these reports are organized by State and Territory. For each subject report within each State or Territory, the report includes the following elements:

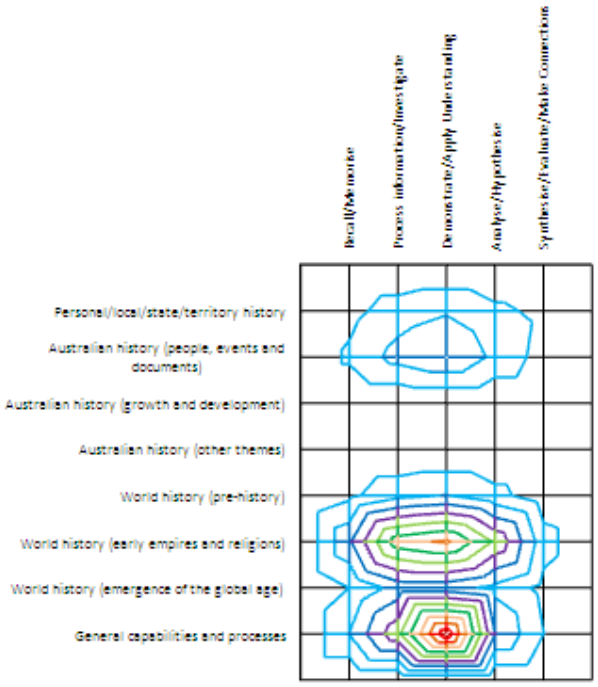
    - **Graphs** which represent the outcomes of the mapping processes for the Australian Curriculum and the State or Territory documents and teaching programs mapped for each curriculum phase used in the jurisdiction. They show the topic and topic group coverage, and the levels of cognitive demand for each of the State or Territory curriculum phases. The graphs show both the extent of coverage (in simple terms, the area covered by the graph lines) and the extent of emphasis on each topic/topic group and area of cognitive demand (in simple terms, the colour and closeness of the graph lines). The following History graphs show the difference in the spread of the topics

covered and the associated extent of emphasis on each topic group and the range of cognitive demands addressed for each topic group.

Australian Curriculum



Curriculum XYZ



These sample History graphs indicate that there is significant overlap between the Australian Curriculum and Curriculum XYZ at this phase of schooling. 'Australian History (people…)' appears substantially in Curriculum XYZ but not in the Australian Curriculum. Curriculum XYZ has a substantially greater representation of 'General capabilities and processes'. The Australian Curriculum has a substantially greater representation of 'World History (emergence…)'. Curriculum XYZ has a greater focus on 'World History (early…)' but less on 'Personal…'. The analysis suggests a high degree of alignment between the two curricula.

It should be noted that the graphs vary in some cases because one curriculum will have a broader coverage (all topic groups) and another will have a narrower coverage (a predominance of a smaller number of topic groups). This will lead to what seems to be greater intensity of coverage for some topic groups for the second curriculum, because the total coverage for each curriculum is 100%. A second reason for variation is the representation of both topic coverage and cognitive demand. If a topic is associated with high ratings for time on topic and substantial levels of cognitive demand, this will produce more apparent intensity in the graph than a case where the topic is associated with low levels of time on topic and cognitive demand.

In the written discussion (see below), there will often be a reference to the level of coverage shown by the graphs, referring, for example, to 'moderate overlap' between the State or Territory graph and the Australian Curriculum graph. This is an attempt to indicate the extent to which the graphs appear to cover a similar curriculum range. This is not the same as the topic coverage index (see below) which might show a 'Low' index despite apparent overlap in

the graphs. This is because there will be cases where the different curricula cover the same or similar topic groups, but do so at different levels of intensity, or where each topic group covered is somewhat different in emphasis and the aggregated difference amounts to a significant variation in the topic coverage index.

- **Topic Coverage Indices** for each curriculum phase used in that jurisdiction, represented by a single number less than or equal to 1. The indices provide a measure of the extent to which the State or Territory curriculum for that stage of schooling is aligned with the Australian Curriculum. The index has been calculated by comparing the absolute difference in the proportion of the curriculum devoted to each topic by the Australian Curriculum and jurisdiction curriculum. An index number of 1.00 (or 100%) represents an exact alignment. An index of 0 (or 0%) represents no alignment. These indices are summarised in tabular form at the beginning of each subject report (see 1 above) along with a legend indicating the levels of alignment represented by the different numbers.

- **A table showing the percentage of the curriculum devoted to each topic group** in the Australian Curriculum and the relevant State or Territory curriculum. The percentage of the curriculum devoted to each topic group is listed for the Australian Curriculum and for each jurisdiction.

  The following table relates to the History graphs above:

% of Curriculum devoted to Topic Group	Australian Curriculum	Curriculum XYZ
Personal/local/state/territory History	11.76%	8.93%
Australian History (people, events and documents)	0.00%	13.65%
Australian History (growth and development)	0.00%	0.00%
Australian History (other themes)	0.00%	0.00%
World History (pre-History)	10.59%	9.18%
World History (early empires and religions)	30.59%	32.75%
World History (emergence of the global age)	31.76%	12.16%
General capabilities and processes	15.29%	23.33%

  A full list of topic groups/topics is appended to this report (see Appendix Seven). These tables support a more detailed analysis of differences at the topic group level between each jurisdiction's curriculum and the Australian Curriculum. It allows the reader to determine where the important differences lie. In many cases, the extent to which the topic coverage index is below 1 results from the sum of mostly small variations in coverage of the various topic groups. This table is a major component of the brief written analysis (see next point for further discussion, including a set of guidelines for determining the significance of different levels of variation between curricula).

- **A short written discussion** of the key variations between the Australian Curriculum and the State or Territory curriculum at the level of topic groups. The graphs and this written discussion provide some explanation as to why

the topic coverage index is at the level indicated. In the written discussion, the following guidelines have been adopted:

- a difference of more than 4% between the topic group coverage percentage indicated for the Australian Curriculum and the percentage indicated for the relevant State or Territory curriculum (eg a difference between 2.1% and 6.4%) is regarded as significant and is referred to in the written commentary;

- a difference of more than 2% but less than 4% is regarded as worth noting but as falling with an acceptable range of variation, and is referred to in the written commentary;

- a case where one framework has a result above 2% and the other has a result of 0% (ie the topic is not represented in that framework at that level), is regarded as material and is referred to in the written commentary;

- differences smaller than 2% are regarded as not material, and are not referred to in the written commentary.

- **A discussion of relative cognitive demand** in the subject as represented in the Australian Curriculum and the State or Territory curriculum. This includes graphic representation of the relative representation of cognitive demand at each phase in the subject and in the subject overall. It also includes a table of percentages of each element of cognitive demand at each phase which are the basis for the graphic representation. In the written discussion, the following guidelines have been adopted:

  - a difference of more than 10% in cognitive demand percentage indicated for the Australian curriculum and the percentage indicated for the relevant comparison curriculum is regarded as significant and referred to in the written commentary
  - a difference of more than 5% but less than 10% is regarded as worth noting but as falling within an acceptable range of variation and is referred to in the written commentary
  - a case where one curriculum has a result above 5% and the other has 0% is regarded as material and referred to in the written commentary
  - differences smaller than 5% are not regarded as material and hence not referred to in the commentary.

One caveat on the commentary concerns the varying significance of percentages allocated to topic groups in different subjects. English and Mathematics, for example, can be assumed to be taught at a significant level at every year of schooling, so percentages of curriculum allocated to a topic group are broadly comparable. History and Science, by contrast, are taught to quite different extents in different States and Territories. Since the curriculum allocation in each subject totals 100%, the topic group allocations may mean quite different things in different subjects or different States and Territories. In a case where a State or Territory curriculum only includes History as one element within a broader SOSE curriculum, and specifies relatively little History content, it is possible that a significant percentage allocation to a topic group might still represent a relatively limited teaching program. The History maps in some States and

Territories show high allocations to ‘General capabilities and processes’, but often limited allocations to other topic group categories, and it may be that the data are drawn from a limited program in History. Variations of this kind are not represented in detail in the data in the report.

ENGLISH

This section of the report is based on the combined results of the curriculum expert mapping of the final version of the Australian Curriculum in English and of curriculum documents provided by each State and Territory and teacher mapping of their programs in the six participating jurisdictions, and on the expert mapping alone for South Australia and Victoria. As noted in the introduction, it includes two elements:

- an account of the overall results for English across Australia; and
- some discussion of the results for States and Territories, where there are significant coverage issues.

The table below shows in summary form the topic coverage indices for all States and Territories and all phases for English. It includes the results of the expert mapping in all States and Territories, combined with the results of the teacher mapping in the six participating States and Territories. The data for all States and Territories is the same data as in the earlier reports from the project.

<table>
<tr><th>Year Levels</th><th>ACT</th><th>NSW</th><th>NT</th><th>QLD</th><th>SA</th><th>TAS</th><th>VIC</th><th>WA</th></tr>
<tr><td>F</td><td rowspan="3">0.82</td><td>0.84</td><td>0.82</td><td>0.84</td><td rowspan="3">0.37</td><td>0.79</td><td>0.61</td><td rowspan="3">0.82</td></tr>
<tr><td>Yr1</td><td>0.78</td><td>0.78</td><td rowspan="3">0.84</td><td rowspan="3">0.80</td><td>0.66</td></tr>
<tr><td>Yr2</td><td rowspan="3">0.84</td><td rowspan="2">0.79</td><td rowspan="2">0.80</td></tr>
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<tr><td>Yr4</td><td rowspan="3">0.82</td><td rowspan="4">0.83</td><td rowspan="4">0.86</td></tr>
<tr><td>Yr5</td><td rowspan="2">0.83</td><td rowspan="2">0.80</td><td>0.64</td><td rowspan="2">0.75</td></tr>
<tr><td>Yr6</td><td rowspan="4">0.85</td><td rowspan="3">0.86</td></tr>
<tr><td>Yr7</td><td>0.83</td><td rowspan="3">0.78</td><td>0.72</td><td>0.82</td><td>0.72</td></tr>
<tr><td>Yr8</td><td rowspan="2">0.83</td><td rowspan="2">0.85</td></tr>
<tr><td>Yr9</td><td rowspan="2">0.81</td><td rowspan="2">0.80</td><td rowspan="2">0.65</td><td rowspan="2">0.80</td><td rowspan="2">0.74</td></tr>
<tr><td>Yr10</td><td>0.86</td><td>0.87</td></tr>
</table>

It is the view of the consultants that the significance of index levels is as follows (note that the colours used in the legend below are also used to indicate coverage indices in the table above):

Index	Level of alignment
Above 0.8	Very high
0.7-0.8	High
0.6-0.7	Moderate
0.5-0.6	Low
Below 0.5	Very low

English in the Australian Curriculum is well aligned with the States and Territories. Viewing Australia as a whole, the average alignment level is 0.78, towards the top of the 'High' range. This suggests that the final Australian Curriculum is on average well aligned with State and Territory curricula.

It is notable that alignment levels are exceptionally high in those States and Territories that participated in teacher mapping. Average alignment levels in those six jurisdictions are around or above the dividing line for 'Very High' alignment In the two States that did not take part in teacher mapping, Victoria has an overall alignment of 0.7 (just into the 'High' range) while SA has an alignment level of 0.59, in the 'Low' range.

Of those jurisdictions that took part in teacher mapping, 25 phases are rated 'Very High' and the other 5 are rated 'High'. Even the curriculum documents alone demonstrate high levels of alignment. Taking all jurisdictions into account, there is only one phase in one State or Territory in English that is rated in the 'Very low' category (the comparison of Australian Curriculum and South Australia for P-2), and one ranked 'Low' (also in SA). In addition, only four phases out of a total of 41 are rated in the 'Moderate' category.

This suggests that in English there is almost complete practical alignment between the Australian Curriculum and curriculum in the States and Territories that took part in the mapping process, and high alignment in all jurisdictions except South Australia.

It is the view of the consultants that ratings of 'High' or above constitute very effective levels of alignment.

At a more detailed level, (see Appendix Three) the data show results for topic groups by State or Territory and by phase. The tables in the Appendix are organized in groups of like phases across States and Territories, in each case including the relevant data from the Australian Curriculum. From this data, the following findings emerge:

1. Overall, the detailed data support the view that alignment levels in English between the Australian Curriculum and State and Territory curricula are very high. There are very few topic groups represented at a material level in the Australian Curriculum that are not represented in State and Territory curricula at equivalent phases of schooling.

2. The South Australian ratings in the primary school years are low largely because of very low relative ratings in: 'Phonemic awareness', 'Phonics', 'Vocabulary' and 'Text and print features' and to some extent in 'Fluency'. Feedback from experts involved in rating the South Australian curriculum framework suggests that the document is not explicit about content in these areas. The absence of teacher mapping data from South Australia means that it is not possible to check whether this position is repeated in South Australian classrooms. If teachers are not presently teaching these topic groups, they may require support in implementation. It is notable, however, that no other State or Territory showed material misalignment in these areas once the teacher data was added to the expert data.

3. There are occasional examples of low alignment at the topic group level in other jurisdictions. At the 'P' level, Victoria has a weak or nil representation of 'Author's craft' and 'Critical reasoning'. At Years 9-10, 'Fluency' is stronger in the Australian Curriculum than in those jurisdictions that have a 9-10 phase. These are, however, isolated examples.

4. In general, the comparison of data from the mapping of the final Australian Curriculum with data from a combination of teacher and expert mapping of State and Territory shows very little misalignment at the topic group level. This suggests that at the classroom level, with the possible exception of South Australia (see point 2 above) there are minimal issues requiring attention in the implementation of the Australian Curriculum in English.

5. In terms of cognitive demand, the Australian Curriculum is somewhat stronger in 'Analyse/Investigate', and 'Evaluate'. It is somewhat weaker in 'Generate/Create/Demonstrate' and 'Perform procedures/Explain'. The only very substantial differences were evident in comparison with the South Australian Curriculum from which, for example, the category 'Memorise/Recall' was almost entirely absent.

MATHEMATICS

This section of the report is based on the combined results of the curriculum expert mapping of the final version of the Australian Curriculum in Mathematics and of curriculum documents provided by each State and Territory and teacher mapping of their programs in the six participating jurisdictions, and on the expert mapping alone for South Australia and Victoria. As noted in the introduction, it includes two elements:

- an account of the overall results for Mathematics across Australia; and
- some discussion of the results for States and Territories, where there are significant coverage issues.

The table below shows in summary form the topic coverage indices for all States and Territories and all phases for Mathematics. It includes the results of the expert mapping in all States and Territories, combined with the results of the teacher mapping in the six participating States and Territories. The data for all States and Territories is the same data as in the earlier reports from the project. The only change in this report is the replacement of data from the mapping of the draft Australian Curriculum with data from the mapping of the final Australian Curriculum as at 12 November.

Year Lev	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
P		0.72	0.68	0.71		0.71	0.70	
Yr1								
Yr2	0.76	0.80	0.79		0.70		0.77	
Yr3				0.80		0.79		0.78
Yr4		0.77	0.76		0.73		0.77	
Yr5	0.79			0.81				
Yr6		0.81	0.83		0.72	0.80	0.84	
Yr7				0.76				0.72
Yr8	0.76	0.71			0.67	0.74	0.77	
Yr9			0.74	0.77				
Yr10	0.78	0.77	0.72	0.77	0.76	0.77	0.79	0.76

It is the view of the consultants that the significance of index levels is as follows (note that the colours used in the legend below are also used to indicate coverage indices in the table above):

Index	Level of alignment
Above 0.8	Very high
0.7-0.8	High
0.6-0.7	Moderate
0.5-0.6	Low
Below 0.5	Very low

Mathematics, like English, is well aligned, with an overall alignment index of 0.76, in the 'High' range on average. This suggests that the final Australian Curriculum is well aligned with State and Territory curricula.

It is notable that alignment levels are high, and very similar, in all States and Territories. Overall alignment levels in all States and Territories are between 0.71 and 0.77, all in the 'High' range'. Across all jurisdictions, seven phases are rated 'Very High' and 32 are rated 'High'. Only two phases are rated 'Moderate'.

This suggests that in Mathematics there is a virtually complete practical alignment between the final Australian Curriculum and State and Territory curricula and a high level of alignment in all jurisdictions.

It is the view of the consultants that ratings of 'High' or above constitute very effective levels of alignment.

At a more detailed level, (see Appendix Four) the data show results for topic groups by State or Territory and by phase. The tables in the Appendix are organized in groups of like phases across States and Territories, in each case including the relevant data from the Australian Curriculum. From this data, the following findings emerge:

1. Overall, the detailed data support the view that alignment levels in Mathematics between the Australian Curriculum and State and Territory curricula are high to very high. There are very few topic groups represented at a material level in the Australian Curriculum that are not represented in State and Territory curricula at equivalent phases of schooling.

2. There are very few examples of topic groups which appear consistently in State and Territory curricula but are not represented in the Australian Curriculum, or vice versa. General capabilities and processes' is somewhat less represented throughout the years of schooling than in State and Territory documents on average, although it is evident at all levels in the Australian Curriculum. While the Australian Curriculum does not include 'Instructional technology' at P, it is better represented throughout the years of schooling than in most States and Territories. 'Basic algebra' is generally better represented in the Australian Curriculum, especially in the early years, than in State and Territory curricula, but it is only in Victoria and Tasmania at P and in isolated other phases that the difference is marked.

3. There are no State or Territory curricula that are at material variance from the Australian Curriculum. There are occasional cases where topic groups present in the Australian Curriculum at a phase are not represented in a State or Territory curriculum. 'Advanced algebra' is not represented in the NT at 7-9, but does appear at 10. The changed expectation that some attention will be paid to this topic group at the earlier phase is unlikely to constitute a material issue for teachers of Mathematics, but may need consideration. There are other topic groups that show a pattern of variance between the Australian Curriculum and State and Territory curricula considered as a whole. 'Probability', for example, is somewhat more strongly represented in the Australian Curriculum during the years 3-6.

4. In the case of cognitive demand, there are two material differences between the Australian Curriculum and State and Territory curricula taken as a whole. The Australian Curriculum is stronger in 'Solve non-routine problems/make connections' than all jurisdictions, and in all but one the difference is material. The reverse is true in the case of 'Memorise facts/definitions/formulas/fluency', where the Australian Curriculum mostly has a lower level of representation. The category

'Perform procedures' is also somewhat stronger in a number of States and Territories.

5. Overall, however, there are virtually no material variations in topic content between the final Australian Curriculum and State and Territory Mathematics curricula, though there are some evident differences in cognitive demand.

SCIENCE

This section of the report is based on the combined results of the curriculum expert mapping of the final version of the Australian Curriculum in Science and of curriculum documents provided by each State and Territory and teacher mapping of their programs in the six participating jurisdictions, and on the expert mapping alone for South Australia and Victoria. As noted in the introduction, it includes two elements:

- an account of the overall results for Science across Australia; and
- some discussion of the results for States and Territories, where there are significant coverage issues.

The table below shows in summary form the topic coverage indices for all States and Territories and all phases for Science. It includes the results of the expert mapping in all States and Territories, combined with the results of the teacher mapping in the six participating States and Territories. The data for all States and Territories is the same data as in the earlier reports from the project. The only change in this report is the replacement of data from the mapping of the draft Australian Curriculum with data from the mapping of the final Australian Curriculum as at 12 November.

Year Lev	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
P		0.63	0.64	0.63		0.66	0.52	
Yr1								
Yr2	0.64	0.63	0.75		0.60		0.46	
Yr3				0.69		0.76		0.68
Yr4		0.65	0.73		0.60		0.53	
Yr5	0.58			0.73				
Yr6		0.62	0.70		0.61	0.74	0.43	
Yr7				0.69				0.68
Yr8	0.68	0.74			0.68	0.72	0.55	
Yr9			0.72	0.71				
Yr10	0.67	0.60	0.76	0.77	0.78	0.74	0.56	0.70

It is the view of the consultants that the significance of index levels is as follows (note that the colours used in the legend below are also used to indicate coverage indices in the table above):

Index	Level of alignment
Above 0.8	Very high
0.7-0.8	High
0.6-0.7	Moderate
0.5-0.6	Low
Below 0.5	Very low

Science is moderately aligned with State and Territory curricula, with an overall alignment index of about 0.66, in the middle of the 'Moderate' range on average. This suggests that the final Australian Curriculum is moderately well aligned with State and Territory curricula.

It is notable that with the exception of Victoria (and one ACT phase) alignment levels are very similar. Alignment levels in all phases in all States and Territories other than Victoria and ACT 3-5 are between 0.60 and 0.77, or 'Moderate' to 'High'. Across all jurisdictions, 15 phases are rated 'High' and 19 are rated 'Moderate'. Only five phases are rated 'Low', and two 'Very low'. Victoria's average alignment level is 0.51, near the bottom of the 'Low' range.

This suggests that in Science, with the exception of Victoria, there is reasonable level of alignment between the final Australian Curriculum and State and Territory curricula. Victoria's alignment, by contrast, is low.

It is the view of the consultants that ratings of 'High' or above constitute very effective levels of alignment. Ratings of 'Moderate' constitute acceptable levels of alignment.

At a more detailed level, (see Appendix Five) the data show results for topic groups by State or Territory and by phase. The tables in the Appendix are organized in groups of like phases across States and Territories, in each case including the relevant data from the Australian Curriculum. From this data, the following findings emerge:

1. The situation in Science is more varied than in the cases of Mathematics and English. There are material differences at many phases between State and Territory curricula and the Australian Curriculum. In addition, there are many cases of relatively minor variations, where a topic group with a low percentage coverage in the Australian Curriculum does not appear in a State or Territory document.

2. All phases in Victoria are rated 'Low' or 'Very low'. The absence of teacher mapping data from Victoria means that it is not possible to check whether this position is repeated in Victorian classrooms. If teachers are not presently teaching these topic groups, they may require support in implementation.

3. An analysis at the topic group level (see the first section of the Science report in Appendix 5) suggests that a good part of the phase-level variation, especially in the secondary school years, is accounted for by variations in the depth of coverage of topic groups which do appear in both the relevant State or Territory's framework and the Australian Curriculum. Data for the topic groups 'Energy' for Years 3-4 and 'Human biology' at Years 5-6 appear below.

% of Curriculum devoted to Topic Group	Australia	NSW	NT	SA	VIC
Energy	3.66%	7.09%	6.67%	14.20%	8.10%

% of Curriculum devoted to Topic Group	Australia	NSW	NT	SA	VIC
Human biology	1.35%	4.36%	6.19%	5.02%	15.43%

Each column refers to the percentage representation of that group in the relevant curriculum framework. It is noteworthy that each framework has a level of coverage of the topic group, but that the extent varies substantially. This level of difference would contribute to a lower rating of the level of alignment of these frameworks, but is unlikely to constitute a problem in implementation of the Australian Curriculum, since

all States and Territories are already teaching the topic groups and could presumably change their coverage to match the expectation of the Australian Curriculum.

4. The data suggests that at a number of primary levels teachers will need some support to expand the range of their teaching in Science. The requirement should not, however, be exaggerated. The expectations in the Australian Curriculum about the extent and form of Science teaching at P, for example, do not constitute a major program. It is likely that in many cases, teacher needs would be met with supporting materials, exemplary programs and ideas for classroom activity. As the next point demonstrates, support is usually needed in a limited number of topic groups.

5. One factor affecting Science especially concerns the number of topic groups in each subject. Science has 29 topic groups, compared with eight for History, for example. This means that no jurisdiction is likely to cover all topic groups at a level, so there are numerous opportunities for apparent alignment differences produce by somewhat different timing and sequencing. If one framework addresses a topic group at Year 3 and another at Year 4, this will produce an alignment issue, but it is probably not material in a school.

6. The specific areas where support may be needed for teachers in one or more States and Territories at the different phases are listed below. Note that these examples are aggregated into phases based on an analysis of State and Territory reports, so phases overlap to some extent. In most cases, the topic group is represented effectively in a number of frameworks, but is missing or weakly represented in one or two.

    - At P: 'Plant biology', 'Animal biology', 'Motion and forces' and 'Properties of matter…'
    - At P-2 and P-3: 'Waves'
    - At 1-2: 'Ecology', and 'Earth systems'
    - AT 1-3: 'Waves'
    - At 3-4: 'Science and technology', 'Ecology', 'Evolution', 'Motion and forces', 'Electricity', 'Earth systems', 'Meteorology' and 'General capabilities and processes'.
    - At 3-5: 'Waves' and 'Meteorology'.
    - At 4-5: 'Evolution'
    - At 4-7: 'Electricity'
    - At 5-6: 'Plant biology/botany', 'Waves', 'Electricity' and 'Evolution'.
    - At 6-7: 'Meteorology'.
    - At 7-8: 'Science and technology', 'Reproduction and development', 'Meteorology' and 'Measurement and calculation…'.
    - At 7-9: 'Nuclear chemistry'

- At 8-9: ‘Waves’ and ‘Nuclear chemistry’
- At 8-10: ‘Biochemistry’
- At 9-10: ‘Animal biology’ and ‘Human biology’.

6. In the case of cognitive demand, there are two material differences between the Australian Curriculum and State and Territory curricula taken as a whole. The Australian Curriculum is stronger in ‘Apply concepts/make connections’ than all jurisdictions, and in most cases the difference is material and sometimes very marked. The reverse is true in the case of ‘Memorise facts/definitions/formulas/’, where the Australian Curriculum mostly has a lower level of representation, and again in most cases the difference is marked.

7. On balance, therefore, Science has a moderate level of alignment with all States and Territories except Victoria, and there are material differences in forms of cognitive demand.

HISTORY

This section of the report is based on the combined results of the curriculum expert mapping of the final version of the Australian Curriculum in History and of curriculum expert mapping of History curriculum documents provided by ACARA and each State and Territory and teacher mapping of their programs in the six participating jurisdictions, and on the expert mapping alone for South Australia and Victoria. As noted in the introduction, it includes two elements:

- an account of the overall results for History across Australia; and
- some discussion of the results for States and Territories, where there are significant coverage issues.

The table below shows in summary form the topic coverage indices for all States and Territories and all phases for History. It includes the results of the expert mapping in all States and Territories, combined with the results of the teacher mapping in the six participating States and Territories. The data for all States and Territories is the same data as in the earlier reports from the project. The only change in this report is the replacement of data from the mapping of the draft Australian Curriculum with data from the mapping of the final Australian Curriculum as at 12 November.

Year Lev	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
P		0.72	0.68	0.65		0.72	0.74	
Yr1								
Yr2	0.73	0.63	0.70		0.54		0.62	
Yr3				0.67		0.73		0.67
Yr4		0.63	0.59		0.55		0.46	
Yr5	0.75			0.79				
Yr6		0.75	0.68		0.74	0.67	0.61	
Yr7				0.67				0.65
Yr8	0.51	0.79			0.63	0.66	0.74	
Yr9			0.70	0.75				
Yr10	0.59	0.67	0.78	0.82	0.58	0.73	0.58	0.67

It is the view of the consultants that the significance of index levels is as follows (note that the colours used in the legend below are also used to indicate coverage indices in the table above):

Index	Level of alignment
Above 0.8	Very high
0.7-0.8	High
0.6-0.7	Moderate
0.5-0.6	Low
Below 0.5	Very low

History is moderately aligned, less than English and Mathematics but with an overall alignment index of 0.67, in the high end of the 'Moderate' range on average. Across the States and Territories there are differences in overall alignment between 0.61 and 0.72.

This suggests that the final Australian Curriculum is moderately aligned with State and Territory curricula.

Of the 41 phases in all, one is rated 'Very High', 16 rated 'High', 16 rated 'Moderate', seven rated 'Low' and one rated 'Very Low'. The fairly even distribution around the moderate range reinforces the view that alignment levels overall are moderate.

This suggests that in History overall there is a reasonable level of alignment between the final Australian Curriculum and State and Territory curricula, but that there are some areas of weaker alignment.

It is the view of the consultants that ratings of 'High' or above constitute very effective levels of alignment. Ratings of 'Moderate' constitute acceptable levels of alignment.

At a more detailed level, (see Appendix Six) the data show results for topic groups by State or Territory and by phase. The tables in the Appendix are organized in groups of like phases across States and Territories, in each case including the relevant data from the Australian Curriculum. From this data, the following findings emerge:

1. The situation in History is significantly more varied than in the cases of Mathematics and English. There are material differences at many phases between State and Territory curricula and the Australian Curriculum. The percentage variations in History are significantly more pronounced than in Science because of the small number of topic groups in History.

2. The levels of alignment evident in the data arise in part from variations in the representation in the early years of the Australian History topic groups, especially 'Australian History (people, events and documents)' and 'Australian History (growth and development)' Secondly, from about Year 4 onwards the Australian Curriculum has a somewhat stronger emphasis on World History.

3. The key issue affecting History, which is not relevant to English and Mathematics and less relevant to Science, is the new expectation that History will be taught as an independent subject at all years of schooling. Some State and Territory frameworks have very limited representation of History where it is not a separate subject, and this is reflected in teacher practice, though not to the same extent. This means that in some cases the data on which graphs and tables are based is thin, especially at the lower year levels, and apparent major variations could reflect relatively limited teaching programs. In these cases it may not be the apparent variations at the topic group level that are the major issue, but the relative absence of the explicit teaching of History at all.

4. At the topic group level, the area of 'Personal/local/…history' is systematically strongly represented in a consistent fashion across the different frameworks In the case of 'General capabilities and processes', the Australian Curriculum shows a somewhat lower percentage allocated to this latter topic group than the States and Territories, though it is often a significant component of the Australian Curriculum.

5. In many cases, the emphasis on 'General capabilities…' in State and Territory curricula is a function of the quite limited inclusion of specific historical content in some curricula. The effect of this is that expert raters identified the elements that are strongly present in the documents, and in the case of SOSE documents this will usually be general capabilities and skills applicable across the whole domain

(rather than specifically historical skills). Where these numbers are high, it is likely that this is a surrogate for the relative absence of explicitly historical content and skills.

6. The specific areas where support will be needed for teachers in one or more States and Territories at the different phases include those listed below.

    - Up to about year 4: the Australian Curriculum is somewhat stronger overall in the representation of the three categories of Australian History ('…people, events and documents', '…growth and development', and '…other themes'). This is a matter of emphasis, since the Australian History categories are mostly represented to some extent in State and Territory curricula.

    - Beyond about year 4: the Australian Curriculum is stronger overall in the representation of the three categories of World History ('…pre-History', '…early empires and religions' and '…emergence of the global age'). In some cases, jurisdictions have nil or weak representations of these topic groups, though more usually the representation is material but somewhat lower than in the Australian Curriculum. This suggests that there will be a requirement to assist some teachers in some States and Territories in teaching World History at 4-10.

7. In addition there is a specific issue concerning the implementation of the History curriculum in the primary years. In some systems, the framework documents make clear that there has been a limited expectation that History will be taught at all before about year 3, and that in some cases the subject is not strongly represented at subsequent primary years. It is likely that this will require assistance to primary teachers, especially those in early childhood, in taking up the expectations of the Australian Curriculum in History, in respect of both content knowledge and approaches to the teaching of History. The point made above, that State and Territory data show a greater representation of 'General capabilities and processes', reinforces this need. In the phases up to 3-4, the average representation of 'General capabilities' in the Australian Curriculum is 28% compared with an average of 44% across States and Territories.

8. In the case of cognitive demand, there are three broad patterns evident in the data. There is a consistent trend for the States and Territories to have a greater focus on 'Demonstrate/apply understanding'. There is also a trend for the Australian Curriculum to have a substantially stronger focus overall on 'Process information/investigate'. Although it is not consistent, there is a general trend for the Australian Curriculum to have a somewhat stronger focus on 'Recall/memorise'. These are also the three categories with the strongest representation in all curricula. Representation of the other two categories of cognitive demand is generally lower and broadly equivalent across all curricula.

APPENDIX 1: PORTER SOURCE METHODOLOGY

The methodology selected to address this task is based on an approach developed by Porter, Polikoff and Smithson[2], who established a 'uniform language' for describing curriculum content, which was then used to analyse and compare curriculum frameworks (the intended curriculum), classroom practice (the enacted curriculum) and assessment regimes (the assessed curriculum). The language can also be used to describe the content of assessment items, text-books and teaching materials.

The uniform language developed by the researchers involves two components:

- a language for describing in detail the knowledge base in each of English, Science, History and Mathematics; and
- a language for describing the 'cognitive demand' of each area, based on a hierarchy of performance expectations.

The first of these consists of lists of topics arranged in broad content categories in each subject domain. In English, for example, the topic group of 'Language Study' includes topics such as 'spelling' and 'effects of race, gender or ethnicity on language and language use'. In Science, 'ecosystems' and 'adaptation and variation' appear as topics within 'Ecology'. The lists of topics are intended to be complete and universal, so that they could be used to describe any curriculum in the relevant domain, regardless of year level, context or level of complexity.

The second category, 'cognitive demand', consists of descriptions of what students can do with particular knowledge. These descriptions are different for each learning area, though they are based on a similar hierarchy of demands consisting of five levels in categories like the following:

- memory and recall
- performing procedures
- communicating, demonstrating, explaining, creating
- analysis, argument and investigation
- evaluation and application in different contexts

Porter (2004: 3) argues that 'the content language for an academic subject should be exhaustive in its inclusion of all possible types of content, and it should be common in the sense that the same language is used across studies and purposes'. He proposes that the terms used in the uniform language should have a common meaning to different people and over time.

The tool for analysis using these categories is a survey listing the knowledge base and cognitive demand applying to a subject area (eg English or Mathematics). The strength of the surveys arises from the interaction of these two categories: respondents (usually curriculum developers or teachers) are asked to respond on a matrix that requires them to indicate whether, for example, a curriculum framework being considered includes:

- a specific topic;
- if so, to what extent; and
- at what level of cognitive demand students are expected to operate in relation to that topic.

A Mathematics framework might, for example, include the expectation that a student will use a linear equation (the topic) to solve a novel problem (the cognitive demand). In English, a framework might require a student at one level to recall (cognitive demand) the difference between fact and opinion (the topic), while at a different level the requirement

[2] Porter (2002); Porter (2004)

could be evaluate (cognitive demand) whether a writer has used facts and opinions (the topic) appropriately in a newspaper article. The topic in this example is the same in both cases (fact and opinion), but the cognitive demand is different.

It is, therefore, in the intersections between the topic lists and the cognitive demands that the curriculum is described. Any curriculum is likely to include some but not all of the content topics for the field, and some curricula will be more comprehensive in their inclusion of topics. Any curriculum is likely to include a range of cognitive demands, and some will include a greater or lesser proportion of higher or lower cognitive demands.

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Porter, A.C. (2004). Curriculum Assessment. Pre-publication draft of an article in J. Green, G. Camilli, & P. Elmore (eds), *Complementary Methods for Research in Education*. Washington, DC: American Educational Research Association, 2004.

APPENDIX 2: ACARA CURRICULUM MAPPING CALCULATIONS

Porter Graph

Step 1 Quality check of survey data

Perform following checks:

1. Ensure that a *Level of Coverage* cell is rated for all topics
2. Check that no more than one *Level of Coverage* cell is rated for each topic
3. Where *Level of Coverage* – None, ensure no *Expectation of Students* cell is rated for the topic

Step 2 Average *Level of Coverage* ratings

Where more than one survey has been completed for a domain/jurisdiction/phase of schooling, average *Level of Coverage* ratings for each topic across multiple surveys

Step 3 Sum weighted *Level of Coverage* ratings

Weight *Level of Coverage* ratings (weighted 1 X Slight Coverage, 2 x Moderate Coverage and 3 X Sustained Coverage) for each survey and add together to find total.

Step 3a Aggregate ACARA surveys to equal Phase of Schooling for comparison curriculum

Find maximum of *Level of Coverage* ratings for each topic across multiple year levels of National curriculum surveys

Find average of *Cognitive Demand* ratings for each topic across multiple year levels of National curriculum surveys

Step 4: *Level of coverage %*

For each topic, weight the *Level of Coverage* (1 X Slight Coverage, 2 x Moderate Coverage and 3 X Sustained Coverage) and divide by Total from Step 3

Step 5: *Average Cognitive Demand*

Where more than one survey has been completed for a domain/jurisdiction/phase of schooling, average *Cognitive Demand* ratings for each topic across multiple surveys

Step 6: *Total Cognitive Demand*

Sum of all Cognitive Demand ratings from *Step 5*.

Step 7: Calculate *Cognitive Demand %*

Cognitive demand cell/*Total Cognitive Demand* from Step 6

Step 8: *Cognitive Demand%* X *Level of Demand%*

For each cell, Level of coverage % x Cognitive Demand %

Step 9: Generate Graph

Use steps 1-8 for the expert mapping data and the teacher mapping data. Average the % coverage and the cognitive demand for the expert mapping data and the teacher mapping data and generate the graph.

Topic Coverage Index

Step 1: *Level of coverage %* for national and comparison curricula

Take *Level of coverage* % for National curriculum and selected combined comparison curriculum.

Step 2: Find absolute differences

Find absolute difference between *Level of coverage* % for national and *Level of coverage* % for the combined comparison curricula

Step3: Calculate *Coverage Index*
For comparison of any two curricula,

$$\text{Alignment Index} = 1 - \frac{\Sigma|X - Y|}{2},$$

Where X = ACARA *Level of coverage* %
Y = Comparison Combined Curriculum *Level of coverage* %

% of Curriculum devoted to Topic Group

Step 1: Sum *Level of coverage* % for all topics in each topic group for national curriculum
Sum *Level of coverage* % for all topics in each topic group for national curriculum

Step 2: Sum *Level of coverage* % for all topics in each topic group for comparison combined curriculum
Sum *Level of coverage* % for all topics in each topic group for the comparison combined curriculum

Step 3: Report
Report *Level of coverage* % for each topic group for national and the comparison combined curricula, or in cases where there is no data, the comparison curriculum documents .

% of Cognitive Demand

Step 1: Sum % Cognitive Demand for all topics in each topic group for national curriculum
For each cognitive demand, sum % *Cognitive Demand* for all topics in each topic group for national curriculum

Step 2: Sum % Cognitive Demand for all topics in each topic group for comparison curriculum
For each cognitive demand, sum *% Cognitive Demand* for all topics in each topic group for comparison curriculum

Step 3: Weighted Average Cognitive Demand for national curriculum
For each cognitive demand, average((Phase 1 Sum %Cognitive Demand x Phase years) +(Phase 1 Sum % Cognitive Demand x Phase years) + … (Phase N Sum % Cognitive Demand x Phase years) for national curriculum

Step 4: Weighted Average Cognitive Demand for comparison curriculum
For each cognitive demand, average((Phase 1 Sum %Cognitive Demand x Phase years) +(Phase 1 Sum % Cognitive Demand x Phase years) + … (Phase N Sum % Cognitive Demand x Phase years) for comparison curriculum