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Productivity Commission

National Education
Evidence Base

Productivity Commission
Inquiry Report

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9 December 2016

The Hon Scott Morrison MP
Treasurer
Parliament House
CANBERRA ACT 2600

Dear Treasurer

In accordance with Section 11 of the *Productivity Commission Act 1998*, we have pleasure in submitting to you the Commission's final report into National Education Evidence Base.

Yours sincerely

Handwritten signature of Jonathan Coppel in black ink.

Jonathan Coppel
Presiding Commissioner

Handwritten signature of Julie Abramson in black ink.

Julie Abramson
Commissioner

Terms of reference

Productivity Commission Inquiry into the National Education Evidence Base

I, SCOTT MORRISON, Treasurer, pursuant to Parts 2 and 3 of the Productivity Commission Act 1998, hereby request that the Productivity Commission undertake an inquiry into the further development of the national evidence base for school and early childhood education.

Background

The Australian Government is committed to working collaboratively with the states and territories to build a world-class education system that equips children to succeed in an increasingly competitive world. Having comprehensive and consistent data that underpins a national evidence base will inform education policy and help improve educational outcomes for children.

While a significant amount of data is currently collected on students, schools and the workforce, data reported nationally is more limited and often inconsistent. Valuable data is also collected outside schools, including in early childhood education and care. Improved access and greater ability to link and analyse national data could enhance the quality and scope of national education evidence that can be used to monitor educational outcomes and inform policy development and evaluation.

Through consultation with states and territories, education authorities and other key stakeholders, this Inquiry will help to identify current investment in national data collection and education evidence, opportunities to collectively invest further, and how we can improve the effectiveness of our investment through a more streamlined, comprehensive and collaborative national approach.

Improving the collection and management of education data in Australia will assist to create a more robust national education evidence base for effective policy and program development to meet our national education objectives and lift our national productivity.

Scope of the inquiry

The Commission is to provide advice on the refinement of the national approach to collecting and using data for early childhood education and care and schools, and other information as relevant, to improve Australia's educational outcomes.

In undertaking this Inquiry, the Commission should use evidence from Australia and overseas to report on and make recommendations about:

1. The information required to provide a comprehensive evidence base to inform policy development in early learning and school education now and in the future. This includes consideration of current data holdings at a national, state and sectoral level, their effectiveness in supporting educational outcomes, and the long term vision for such educational data holdings.
2. What additional information could be considered and how it might add value to the existing evidence base. This may include data concerning non-cognitive skills, and information from other sectors, including but not be limited to: employment, health, social services, early childhood and higher education.
3. Existing or potential barriers to the sharing of education (and other relevant) data and how these can be overcome. Considerations should include, but not be limited to: privacy concerns, costs, technological capacity, sector-based sensitivities, national and jurisdictional data governance structures and workforce capability.
4. Factors that inhibit access to, and consistency of, education-relevant data to support analysis and evidence-based policy development. Considerations should include, but not be limited to: privacy concerns, legislative and technical frameworks, national and jurisdictional data governance structures, workforce research and analytical capabilities, stakeholder engagement, sector-based sensitivities and implementation timeframes.
5. The role technology and mobile devices can play on the scope, quality and timeliness of data collection and reporting.
6. The costs and benefits of options for improvements to the national education evidence base including the administrative and financial impacts on schools and early childhood education and care providers of any suggested change in data collection practices. Consideration should include what opportunities exist to apply efficiencies to existing data collection.
7. How Australian and overseas governments have approached the use of evidence and sharing data to improve outcomes (in education and non-education sectors) and the potential benefits and challenges of adopting these practices in the Australian education context.

Process

The Commission is to undertake a public consultation process, including holding hearings, inviting key stakeholder and public submissions, and releasing a draft report.

The final report should be provided within nine months of receipt of these terms of reference.

SCOTT MORRISON

Treasurer

[Received 11 March 2016]

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Abbreviations

ABS	Australian Bureau of Statistics
ACARA	Australian Curriculum, Assessment and Reporting Authority
ACECQA	Australian Children’s Education and Care Quality Authority
AEDC	Australian Early Development Census
AESOC	Australian Education Senior Officials Committee
AHURI	Australian Housing and Urban Research Institute
AIFS	Australian Institute of Family Studies
AIHW	Australian Institute of Health and Welfare
AITSL	Australian Institute for Teaching and School Leadership
ALLD	Australian Longitudinal Learning Database
ALRC	Australian Law Reform Commission
APP	Australian Privacy Principles
APPA	Australian Primary Principals Association
ARA	Accredited Release Authority
ATO	Australian Tax Office
AURIN	Australian Urban Research Infrastructure Network
CCMS	Child Care Management System
CEO	Chief Executive Officer
CESE	Centre for Education Statistics and Evaluation
CITO	Central Institute for Test Development
COAG	Council of Australian Governments
CYDA	Children and Young People with Disability Australia
DAC	Data Analytics Centre
DECD	South Australian Department of Education and Child Development
DET	Australian Government Department of Education and Training
DSG	Data Strategy Group

EC	Education Council
ECEC	Early childhood education and care
EEF	Education Endowment Foundation
ESA	Education Services Australia
EYLF	Early Years Learning Framework
FOI	Freedom of Information
HILDA	Household, Income and Labour Dynamics in Australia Survey
HREC	Human Research Ethics Committee
ICILS	International Computer and Information Literacy Study
ICT	Information and communications technology
IDI	Integrated Data Infrastructure
IES	Institute of Education Sciences
IPP	Information Privacy Principles
ISCA	Independent Schools Council of Australia
IT	Information technology
LSAC	Longitudinal Study of Australian Children
LSAY	Longitudinal Survey of Australian Youth
LSIC	Longitudinal Study of Indigenous Children
MADIP	Multi-Agency Data Integration Project
MCEETYA	Ministerial Council on Education, Employment, Training and Youth Affairs
MCRI	Murdoch Childrens Research Institute
METeOR	Metadata Online Registry
NAP	National Assessment Program
NAPLAN	National Assessment Program — Literacy and Numeracy
NCCD	Nationally Consistent Collection of Data on School Students with Disability
NCRIS	National Collaborative Research Infrastructure Strategy
NCVER	National Centre for Vocational Education Research
NECD RD	National Early Childhood Development Researchable Data Set
NECECC	National Early Childhood Education and Care Collection
NHMRC	National Health and Medical Research Council

NID	National Interest Dataset
NMA	National Mutual Acceptance
NQA ITS	National Quality Agenda IT System
NQF	National Quality Framework
NSIP	National Schools Interoperability Program
NSSC	National School Statistics Collection
OAIC	Office of the Australian Information Commissioner
OECD	Organisation for Economic Co-operation and Development
PHRN	Population Health Research Network
PIA	Private impact assessment
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
RCT	Randomised controlled trial
SCRGSP	Steering Committee for the Review of Government Service Provision
SCSEEC	Standing Council on School Education and Early Childhood
SiAS	Staff in Australia's Schools Survey
SIF	Systems Interoperability Framework
SRC	Social Research Centre
STEM	Science, technology, engineering and mathematics
SVA	Social Ventures Australia
TALIS	Teaching and Learning International Survey
TIMSS	Trends in International Mathematics and Science Study
USI	Unique student identifier
VET	Vocational education and training
VSN	Victorian Student Number

OVERVIEW

Key points

- Notwithstanding increases in expenditure on education per student over the past decade, national and international assessments of student achievement in Australia thus far show little improvement and in some areas standards of achievement have dropped.
- Monitoring outcomes, performance benchmarking and competition between schools alone are insufficient to achieve gains in education outcomes. They must be complemented by the use of data and evidence to identify, and then apply, the most effective programs, policies and education practices.
- A national education evidence base is broader than a national data repository and requires two key capabilities:
 - a ‘top-down’ capability, for monitoring, benchmarking and assessing performance in achieving objectives at all levels of the system, as well as promoting transparency and accountability, promoting competition between schools and informing resource allocation
 - a ‘bottom-up’ capability that evaluates the effectiveness of education policies, programs and teaching practices, enabling systematic identification of ways to improve student achievement.
- There are much education data collected, imposing a substantial compliance burden across schools and early childhood education and care services. This burden can be reduced by collecting data more cost-effectively and making better use of it.
- Access to, and sharing of, education data would be substantially improved through reforms proposed in the Commission’s draft report on Data Availability and Use.
- Meanwhile, there is also scope to improve sharing of education data for research purposes by changing current administrative processes for collecting some education data.
- There are gaps in existing data collections and work in train should fill many of them.
- But the largest gaps in the national education evidence base relate to evidence, notably:
 - the evaluation of policies, programs and education practices in Australian schools and early childhood education and care services to identify what works best, for whom and in what circumstances
 - building an understanding of how to turn best practice into common practice on the ground, which is as important as evaluating what works best.
- Creating an evidence-based approach to education policy and teaching practices and turning best practice into common practice are also required to drive better value for money and improve the outcomes achievable from any given level of expenditure.
- The Australian, state and territory governments must take a shared and co-operative approach to developing a high-quality and relevant Australian education evidence base. There are already effective arrangements for monitoring and performance reporting. To implement the bottom-up capability, governments should:
 - put in place a National Education Evaluation Agreement that defines the objectives of, and framework for, commissioning and applying evaluative research about what works best
 - assign the Australian Curriculum, Assessment and Reporting Authority (ACARA) as the institution to be responsible for the implementation of the evaluative research framework, which is accountable to, and funded by, all governments
 - specify ACARA’s new governance arrangements, functions and operations.

Overview

Early childhood education and care (ECEC) and school education bear on the wellbeing and quality of life of young Australians as well as on the capabilities and productivity of Australia's future labour force. Recognising this, Australian governments have committed to national education goals that emphasise the importance of excellence and equity in Australia's education system. Like other developed nations, Australia has sought to achieve these goals through increased investment in education and by implementing reforms focused on monitoring, performance benchmarking and reporting against national standards.

It will take time for reforms to yield improvement in education outcomes, and to date, they are yet to do so. Australian students' performance on national and international student assessments has stalled or, in some cases, declined. Furthermore, Australia is not alone in this regard. Other countries have also increased their investment in education, and emphasised targets, accountability and transparency, with the aim of driving improved outcomes through competition between schools. Similarly, these efforts have not seen commensurate improvement in metrics of student achievement.

Both here and overseas, there is a growing consensus that even though resourcing and an accountability focus are important, by themselves they are insufficient to achieve gains in education outcomes. Creating an evidence-based approach to education policy and teaching practices and turning best practice into common practice are also required to drive better value for money and improve the outcomes achievable from any given level of expenditure. Even small improvements in outcomes for all students from applying evidence to policy making in schools and classrooms would offer significant benefits to Australian families and the economy.

What has the Commission been asked to do?

The Australian Government has asked the Commission to investigate the further development of a national education evidence base. The task is to consider the case for, and specific nature of, a national evidence base to inform policy development and improve education outcomes in early childhood and school education. The appropriate level of funding provided by governments and formulae used by governments to fund ECEC and schools are not within the scope of this inquiry.

The Commission has set out a framework for how to improve Australia's evidence-based education capability and embed evidence-based decision making in education policies, programs and teaching practices. The Commission has not reviewed the education

evidence base itself. Judgements based on evidence about ‘what works best’ in education practice are also beyond the scope of this inquiry, but the Commission does use examples to illustrate the framework.

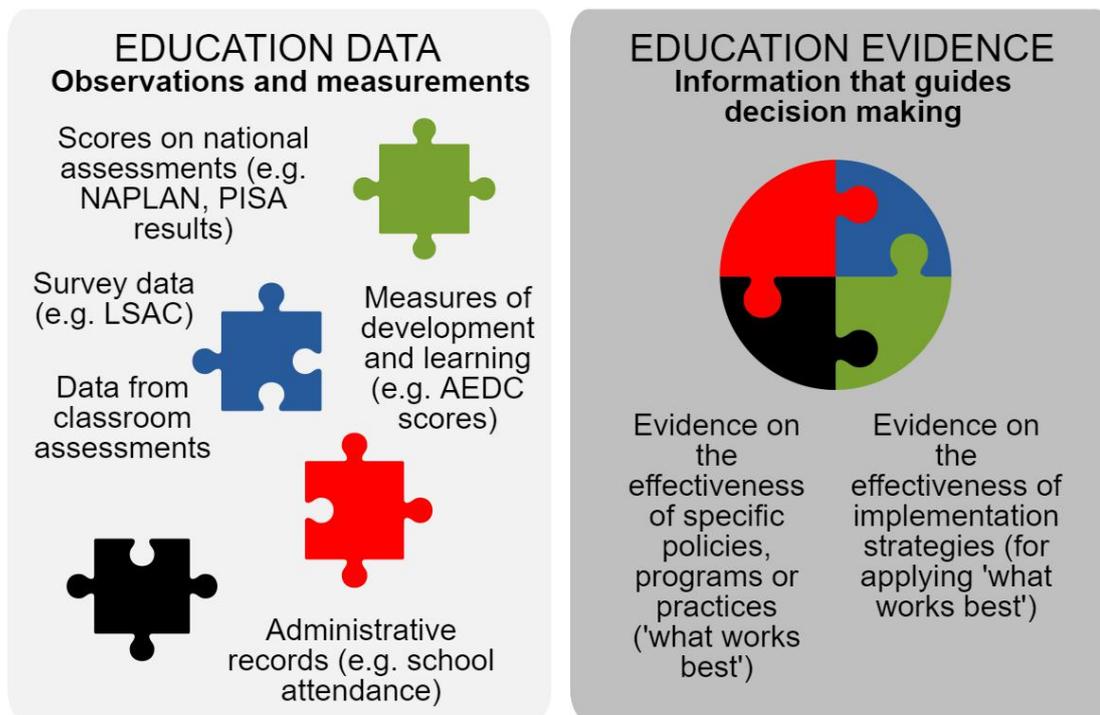
Specifically, the Commission has assessed and made recommendations about: the information required to create a comprehensive evidence base; data collections that would add value to the evidence base; addressing barriers to the sharing of education data; factors that inhibit access to and use of data; and the role that technology can play. The Commission has looked at these issues through the lens of their costs and benefits.

What is a national education evidence base?

A national education evidence base supports the monitoring of progress against education objectives, the identification and diagnosis of problem areas, and the development of ways to improve ECEC and school education outcomes. It is also essential for promoting transparency and accountability by those responsible for policy formulation and its implementation in schools and ECEC settings.

An effective national education evidence base is more than a simple accumulation of data in a single collection or data ‘warehouse’ (figure 1). It should support decision makers at all levels of the education system (national, jurisdictional, schools and ECEC services, teachers, families and communities) to make evidence-informed choices. The overarching policy objective is to improve education outcomes in a cost-effective manner.

Figure 1 **Distinguishing between data and evidence**



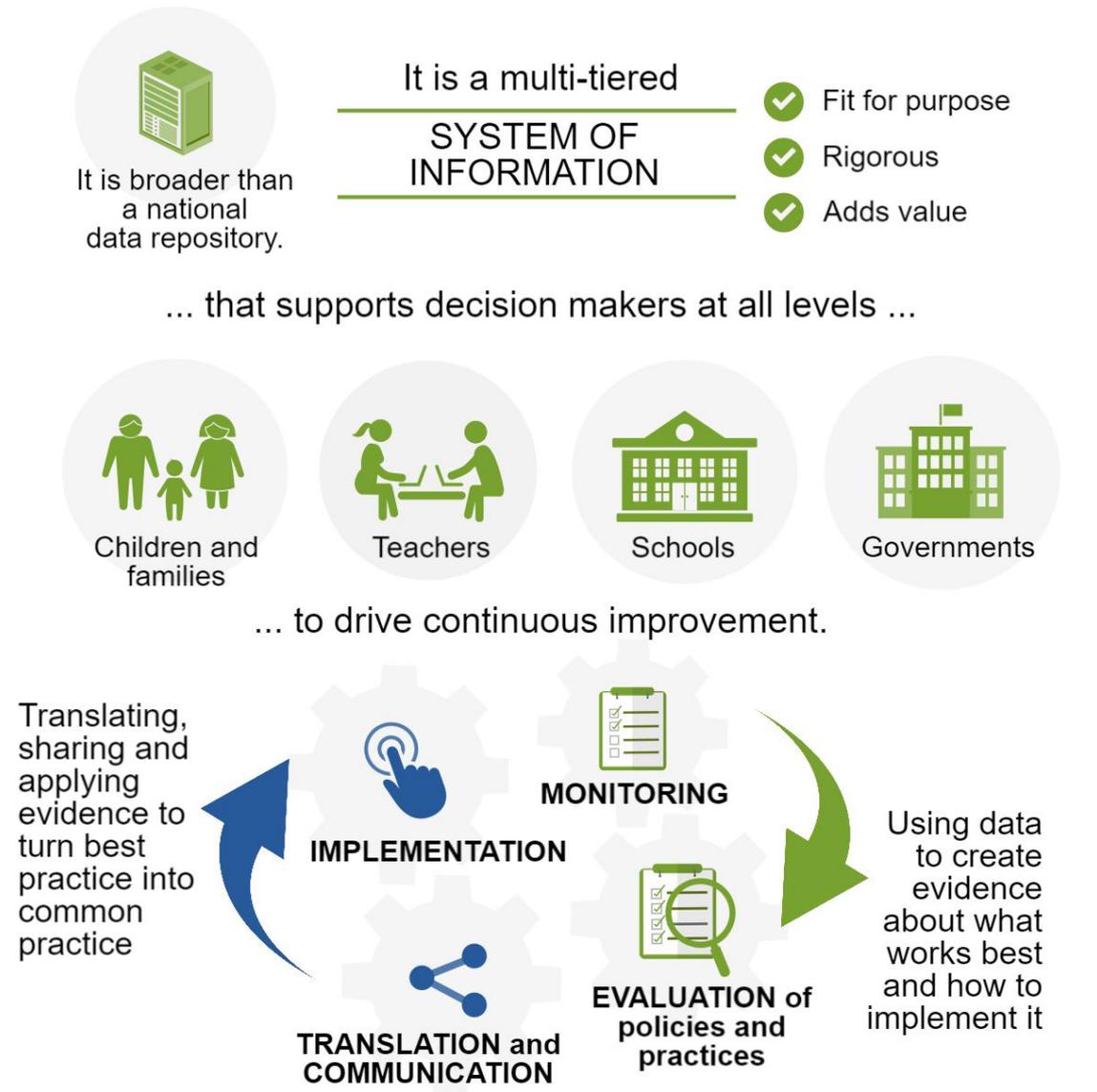
A framework for furthering the education evidence base

The Commission's framework for assessing the requirements for a national education evidence base is outlined in figure 2.

In supporting the further development of a national education evidence base capability, governments should be guided by principles. Specifically, the national evidence base should:

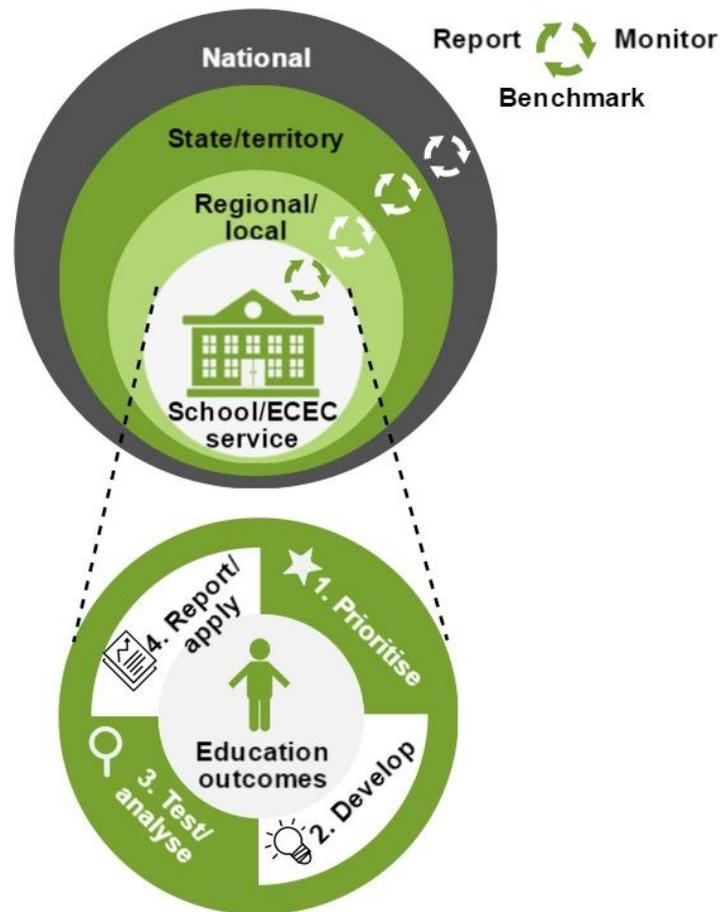
- meet the varied needs of decision makers at all levels of the education system
- provide high-quality data and evidence to inform decisions
- drive improved student achievement through four interconnected processes — monitoring of performance, evaluation of what works best, the translation and dissemination of evidence, and its application by educators and policy makers
- generate benefits in excess of the costs incurred in collecting and processing data and in creating, sharing and applying evidence.

Figure 2 **What is an effective national education evidence base?**



Central to this framework is the importance of complementing ‘top-down’ monitoring and performance benchmarking of the education system with ‘bottom-up’ evaluation of what works best in education policies, programs and teaching practices (figure 3).

Figure 3 **Top-down and bottom-up approaches should work together**



Monitoring and benchmarking can promote transparency and accountability about how the education system has performed in light of the resources invested in it, reveal where weaknesses in the education system lie and guide resource allocation. Monitoring is an essential first stage in an evidence-based approach to improving education outcomes. Without good measures of progress towards stated objectives — and benchmarks against which to interpret this progress — it is not possible to assess robustly the efficacy and cost-effectiveness of policy interventions, school programs, or teaching practices. That is, monitoring complements, and is a precursor to, effective evaluation and implementation.

However, top-down monitoring and benchmarking alone are insufficient to drive improvements in education outcomes. Measuring and monitoring performance does not automatically lead to insights as to what policy and practice can do to help students to learn better, teachers to teach better, and schools to operate more effectively.

Evaluation plays a crucial role in identifying which teaching practices and school programs are the most effective and offer the best value for money. This requires creating

high-quality evidence on what works and what does not work to improve education outcomes.

It is also necessary to evaluate how best to translate, communicate, and apply the evidence about best practice so that it is adopted and adapted by educators and policy makers. This requires development of guidelines and toolkits for practitioners. It also requires engagement of, and partnerships with, educators to turn best practice into common practice.

Existing data should be collected and used more effectively

All Australian governments invest considerable effort and resources in collecting data on ECEC, schools and external influences impacting on education outcomes. For example, there are national ECEC collections that contain administrative data on: children, staff and ECEC providers; child development at age five; ECEC service quality; and the ECEC workforce. In the school sector, there are national data collections that include data on all students, staff, schools and student outcomes. Collections on external influences on outcomes include health, social services, and demographic and labour force data. The potential of these collections is not being fully realised.

Data linkage can leverage the value of existing education data

Data linkage is a key area in which greater value could be drawn from existing education data holdings. Data linkage leverages the value of existing education (and other) data for evidence-based education policy and teaching practice. It can enable a more comprehensive understanding of the factors that contribute to education outcomes, and can also support the targeting of education interventions to specific groups in the population, such as students with disability. Almost universally, inquiry participants supported greater linking of data collections to facilitate research and further the education evidence base. For example, there are sizable benefits from linking ECEC data with *National Assessment Program — Literacy and Numeracy* (NAPLAN) data to facilitate research into the impact of ECEC participation and service quality on student achievement in school.

The main impediments to greater use of data linkage are the complexity of the legislative environment governing the management of personal information and a risk averse culture among data custodians and ethics approval committees. This culture adds considerably to time delays and the cost involved in gaining access to data, and prevents some research proposals from proceeding.

The Commission is currently working on a separate inquiry into *Data Availability and Use* and has released a draft report. The Commission has concluded that the current frameworks and protections for data collection and use are broken and in need of major reform. The draft recommendations in that report are designed to improve access to and

use of data more generally and would also address the impediments to data linkage and data sharing identified in this report.

The recommendations in this report, although narrower in scope, are consistent with the recommendations in the *Data Availability and Use* draft report. Some recommendations in this report would become redundant under the proposals in the other report. However, they do provide an opportunity to improve data collection and sharing for education research within the existing legislative framework.

It is highly desirable that linked education data sets are retained by a trusted linking authority, rather than destroyed. The *Data Availability and Use* inquiry has proposed a broad and far reaching approach that would, if implemented, also make this possible.

Developments in information technology can also play a role here. For example, the Sax Institute has developed the *Secure Unified Research Environment*, which is a remote-access data research laboratory for analysing routinely collected data. The facility allows researchers to log in remotely and securely analyse data from sources such as hospitals, general practices and cancer registries. Such systems provide researchers with access to data while preventing the disclosure of personal or confidential data. For authorised researchers with ethics approval, access can be gained to identified data.

Privacy provisions should be harmonised

The public interest benefits of allowing greater access to data are substantial, but they need to be balanced against the legitimate risks associated with misuse of those data. However, achieving this balance is hampered by the complexity of the legislative environment governing the use and disclosure of information. There is scope to unlock the latent value of existing data while respecting the goals of privacy legislation and arrangements.

Differences in the provisions of Commonwealth, state and territory privacy Acts, education Acts and other legislation impose tight limits on the ability of education data custodians to release data that contain personal information. These differences can prohibit entire data collections from being accessed or shared, or prohibit disclosure of component cohorts of the same dataset. For example, provisions under family assistance law constrain the dissemination of identified childcare data.

Several jurisdictions specifically allow the sharing of data with other jurisdictions provided the recipient is subject to the same privacy principles as the originating jurisdiction. This effectively means mutual recognition of privacy laws in ‘like’ jurisdictions.

However, a lack of uniformity remains in privacy regulation across jurisdictions. Greater uniformity of privacy laws would go some way toward reducing regulatory complexity. The Australian and ACT Governments should extend available exceptions to privacy laws to cover public interest research purposes generally. Western Australia and South Australia

do not have a legislated privacy regime. These jurisdictions should ensure that their privacy arrangements reflect a similar public interest research exception.

For now, obtaining prior consent could facilitate greater access to data

ECEC and school administrative data have often been collected without consent to share or use personal information for a purpose beyond that for which the data were collected. In this situation, the data custodian is not able to disclose personal information to other entities or researchers. Further, it might not be practical for each researcher to obtain consent to use personal information for each ECEC child or school student at a later date. The absence of consent makes it challenging to bring datasets together for education research.

The approach to data access and use set out in the Commission’s Data Availability and Use draft report would address this issue.

Meanwhile, greater use should be made of existing mechanisms available to share personal information to facilitate education research. ECEC service providers and schools should incorporate formal consent and notification to individuals about use of their personal information for education research at the point of data collection.

Advances in technology also offer the potential to reduce the time and cost of seeking consent to use data for education research.

Restrictions on access to de-identified data should be removed

Privacy laws do not apply to de-identified or anonymised data, so data custodians should not use privacy law as a basis for restricting access to such data. Concerns that users of de-identified data will try to re-identify individuals using other data sources could be addressed through an agreement between the data custodian and the trusted user that would proscribe such activity. Therefore, governments should introduce clear policy guidelines that give explicit permission to data custodians to release de-identified data to trusted users. Further, de-identified datasets with extremely low risk of re-identification should be publicly available. This would help to make the process of accessing education data more streamlined, transparent and efficient.

Ethics committees sometimes restrict access to de-identified data for research purposes on the basis of judgements about the worthiness of the proposed research. There is no case for restricting access to data on such grounds.

Where research requires linking of data collections using personal information, or trials involving individual children or young people, ethics committees will still play an important role. However, there is scope to simplify research approval processes. Often it is necessary to obtain approval from more than one ethics committee before a research

project can proceed. A national research project may require as many as 20 approvals. The time and costs involved can be high and this is likely deterring research from proceeding. This is another area where mutual recognition of approval decisions, in this case by ethics committees, would make the process of accessing education data faster and less costly.

A register of available education datasets and metadata is needed

There is often limited information available to researchers about the existence and contents (data items) of education datasets. Consequently, researchers often have difficulty determining whether there are data collections that would fit their data requirements.

One way to address this matter is through the creation of a single online register of education data collections and their associated metadata. An online register could play an important role in bringing education datasets to the attention of researchers and clarifying the information that could be available, particularly in administrative datasets. This would contribute to the value of education data being realised.

A register need not be a costly exercise. Data custodians have information about the content and characteristics of their data. This should be attached to the register. In some cases the metadata may not be well documented, and there would be costs to data custodians in creating information suitable for publication. But there would also be benefits if better documentation improved custodians' abilities to use the data.

There would be advantages to the register including datasets from other sectors, for example, datasets about child health and the environments in which children live.

A unique national school student identifier has merit

All Australian governments endorsed the establishment of a unique student identifier in 2009. But to date, there has been limited progress towards this goal. Currently, many jurisdictions use different identifiers across sectors of their education systems. Only Victoria and the ACT use a unique identifier across government and non-government schools (ECEC is not covered).

The introduction of a nationally consistent system of unique student identifiers would offer significant benefits to schools, teachers and families as well as supporting data linkage for education research purposes. A national identifier would enable tracking of individual student outcomes over time, across jurisdictions and between government and non-government schools. Having access to students' historical academic and administrative records would make it easier and more efficient for schools and teachers to prepare programs and strategies that support students' individual learning needs. It would also enable families to have ongoing records of their children's NAPLAN and other outcomes in a way that illustrates their children's learning progress over time. For researchers, unique student identifiers would provide a straightforward way of accessing

longitudinal data on students' outcomes and other personal information (such as disability status), which can form an essential 'backbone' of data for conducting evaluations of the impact of specific programs and interventions.

However, implementing unique student identifiers across school systems is costly. To minimise these costs, the introduction of a nationally consistent system of student identifiers should be phased in gradually and build upon jurisdictions', schools' and school systems' existing student identification management systems.

The value of a national identifier would be higher if it covered children in ECEC because it would facilitate the sharing and linking of data from the ECEC and school systems. However, the costs would also be larger because both the ECEC system and the implementation issues are more complex.

The establishment of a child identifier for ECEC should remain a long-term goal. The way forward on extending a unique identifier into early childhood should be informed by the experience in developing and implementing nationally consistent school student identifiers.

Data collection costs could be reduced

There are significant costs to collecting data. Administrative costs are borne by the agencies responsible for aggregating, processing and reporting on data. These costs are often concentrated, so are more visible within the responsible government agencies. Compliance costs are borne by the organisations and individuals, such as schools, ECEC providers, educators and parents that supply the data to these agencies. Compliance costs are often hidden and less readily observable because they are spread across a large number of data providers. These costs could be reduced.

Census and survey data should be used on a fit for purpose basis

Some data have to be collected on a census (whole of population) basis to be fit for purpose — for example, where a school funding allocation model is based on data about the individual attributes of students, or where student achievement tests are used to check progress against national goals.

However, it is not always necessary to have data on the full population to create robust and informative evidence. Surveys (data collections on samples of the population) can significantly increase the breadth of information collected, creating data resources that are fit for research purposes that require richer detail. For example, to analyse the role and impact of parental engagement on the education outcomes of students, researchers might need specific and detailed information on aspects of the home learning environment. The costs of collecting data through a survey are much lower than the costs of collecting equivalent data through a census. And the costs of a survey can be reduced by linking to census data where it is fit for purpose, thereby reducing duplication of data collection.

Duplication could be addressed

Duplication in data collection or processing unnecessarily adds to compliance costs for data providers and increases the administration cost of agencies.

Duplication in data provision obligations can occur because departments or governments are unable or unwilling to share the information they gather (or to share information in the form preferred by users of the data). For example, a school may be required to supply information on students with disability to both the Australian Government and to a state government, using different definitions of disability. A national unique student identifier could reduce duplication by making it easier to link to existing data rather than collecting the same data on more than one occasion.

Reporting requirements could be changed less frequently

Changes to reporting requirements impose additional compliance costs on those providing data, particularly when these changes are frequent. Education providers upgrade their information systems on regular cycles and vendors incorporate new reporting requirements into their systems. Costs can be reduced by avoiding frequent changes to reporting requirements, and when changes are necessary, by allowing respondents sufficient time to comply with the new reporting requirement.

Smart use of technology can reduce duplication and improve data quality, including timeliness in reporting. Information technologies can also make data collections simpler to use and easier to interpret by educators, parents and the community.

Data quality issues should be assessed using a principled approach

Many education data collections have characteristics that might be construed as quality issues, such as timeliness of release or the accuracy with which concepts are measured. For example, comparability and consistency issues are frequently raised about ECEC data. Decisions about whether to address a potential data quality issue should be guided by the following principles.

- Is the existing quality of data fit for purpose? The case for addressing a data quality issue is strongest if the data are not fit for the purpose for which they are collected.
- If there is a case to improve data quality, is improvement feasible? Data collectors sometimes have little control over the data provided to them. For example, there is little that schools can do to correct the gaps and errors in self-reported data provided by parents about their education and occupation.
- Could the desired data be obtained using a different approach? Data linkage or new fit for purpose collections might be a more effective and efficient way of addressing an issue.

-
- Would there be a net benefit in improving data quality? Improving data quality is likely to impose costs on those who provide, collect and manage data. The benefits of improving data quality — for example, opportunities for valuable research that would not otherwise be possible — must outweigh these costs.

More work is required to address data gaps

It is not difficult to identify potential candidates for new data collections. But, as noted above, collecting data involves significant costs. In identifying where new collections are warranted, the Commission has focused on areas that have the largest potential to improve national monitoring and evaluative processes, with the ultimate goal of improving education outcomes.

Additional national collections are needed and steps are in train

Additional data need to be collected to support the monitoring of progress against Australia's education objectives, including:

- national measures of student achievement in Year 1, which would facilitate value-added analysis and shed light on the impact of early achievement on later outcomes, and help identify students needing intervention in the early years of school
- measures of students' non-cognitive capabilities, wellbeing and engagement, which would reveal progress in the development of students' social and emotional skills
- nationally consistent data for students with disability, including appropriate measures of outcomes, would help educators support these students.

In addition, improved education workforce data are necessary to support workforce planning and assessment of the impacts of initial teacher education on classroom readiness and student outcomes.

Steps are in train to address these gaps. The Australian Government has announced that Year 1 assessments will be introduced nationally. The Australian Curriculum, Assessment and Reporting Authority is working to embed measures of personal and social capability within existing assessments in the *National Assessment Program*, and is collaborating with states and territories to better measure student wellbeing and engagement. The *Nationally Consistent Collection of Data on School Students with Disability* is expected to become part of a continuous process for supporting students with disability. And the Australian Institute for Teaching and School Leadership is working on a national minimum dataset that will provide more comprehensive and continuous data on school teachers.

A new longitudinal study cohort of Australian children should be funded

Linking of existing (and new) national data collections can support valuable research. However, some questions are more effectively addressed using more detailed and qualitative data about students. The *Longitudinal Study of Australian Children* (LSAC) and the *Longitudinal Study of Indigenous Children* (LSIC) (started in 2004 and 2008, respectively) have yielded insights into children's outcomes that cannot be obtained from administrative data alone. But many of the children in the original studies are now teenagers. Economic and social conditions have changed, as have many policy settings, since these studies commenced. New cohorts need to be recruited periodically to LSAC to support ongoing analysis of children's outcomes. Fit for purpose administrative data should be linked to these longitudinal survey data to reduce the cost and expand the usefulness of the survey.

The design of the new longitudinal cohort should also build upon lessons learnt from the use of the original LSAC and LSIC surveys. For example, it might be appropriate to oversample Indigenous children and other disadvantaged groups in LSAC to enable more robust and representative analysis of key issues relating specifically to Indigenous or disadvantaged groups.

Information about external influences

Education outcomes are affected by influences that the education system cannot directly manage, for example, a child's gender, health and the culture of their home learning environment. It is important to take these external influences into account when evaluating the effects of education policies, programs and practices on education outcomes. If data on these influences are not available, valuable insights about how the effects of an initiative vary for different groups of children (for example, between those from more and less advantaged backgrounds) will be missed. There is also the risk that estimates of the relationship between an initiative and an outcome will be biased.

Much information on external influences is already available from education and administrative datasets and the Australian *Census of Population and Housing*. Where such data are fit for purpose, improved data linkage processes will suffice, leveraging the value of existing collections. An example is a study using linked LSAC and NAPLAN data, which found that a positive early home learning environment (as measured when a child is aged 2–3 years) improves children's later achievement in Year 3 reading and numeracy tests, by an amount equivalent to between two and four months of schooling in Year 3.

However, there remain some significant gaps. Data are lacking, for example, on some aspects of parental engagement and the culture of the home learning environment. There is merit in collecting these data, but they do not have to be collected for all students. The data considered to be most relevant could be collected for a representative sample of students.

Three evidence gaps need attention

The contribution of early childhood education and care to outcomes

There is a growing body of international evidence on the benefits of quality ECEC, but there is limited evidence for the Australian context. Unknowns include how ECEC attendance (in terms of both days and hours) affects children's outcomes, including subsequent school achievement, and how ECEC programs benefit different groups of children and families.

These issues could be explored using linked data. The *National Early Childhood Development Researchable Data Set* being developed by the Australian Institute of Health and Welfare could be fit for this purpose, although development of this resource is currently awaiting support from the Australian Government. A recent data linkage initiative by the ABS could also contribute to the Australian evidence base on ECEC. It is further developed and is used more widely by researchers.

Value-added measures of education outcomes

Point-in-time measures of student achievement, captured in NAPLAN scores for example, do not provide a full picture of the impact that schools have on student learning. Value-added measures are preferred because they take into account two additional aspects of student achievement: progress over time and external influences that schools have little control over. That is, value-added analysis focuses on the growth in student learning attributable to a school. This is the growth in a student's learning, over and above that expected given the backgrounds and prior levels of achievement of students within the school.

Value-added measures are useful for further analysis of school performance and identifying schools that are consistently improving the achievement of their students over time compared with other schools having similar student and school characteristics. Looking under the bonnet of such schools is a useful starting point to gather preliminary evidence about whether they have implemented programs and practices that have potential to improve education outcomes in other schools.

Use of these measures is in its infancy in Australia.

What works best to improve outcomes?

Many of the questions that decision makers in the education system need answers to are descriptive — for example, 'how well are students performing?', 'how are resources distributed?' and 'how many students are undertaking initial teacher training?'. Questions of this type are associated with monitoring and benchmarking, or a top-down approach. Answering them typically requires large scale datasets and relatively simple data analysis.

Questions like ‘will the approach adopted in this successful school have a similar impact on student outcomes in other schools?’, ‘what effect does this program have on student outcomes?’, ‘what approaches to engaging parents have the largest impact on their children’s outcomes?’, and ‘which teaching practices will have the largest effect on the achievement of all students in my class irrespective of their individual current level of achievement?’ are about the impact or effect of initiatives. High-quality and rigorous assessment of questions like these typically requires a bottom-up approach, using small scale research projects and datasets that are often question-specific and apply sophisticated quantitative research methods.

Some potential targets for this analysis of how best to improve outcomes will be relatively easily identified, such as literacy and numeracy programs or the use of information technologies in the classroom. Others can be uncovered through exploratory analysis of the relationship between an outcome of interest and factors that might affect it, using larger scale datasets.

The impact of an initiative on student outcomes or the effect of an implementation strategy can then be tested using appropriate, high-quality, research techniques. Amongst the gold standard techniques are meta-analyses of randomised controlled trials and individual trials. Such approaches are widely used in health research, but are not routinely used in Australian education research.

An example of the insights that this type of evaluation can yield is set out in box 1.

Box 1 Applying randomised controlled trials to evaluate teaching assistants in the United Kingdom

The United Kingdom employs about 255 000 teaching assistants at a cost of over £4 billion a year (or 10 per cent of the education budget). Evidence suggested that they made little difference on average to the attainment of students. But the effects varied between classrooms. In classrooms where teachers and assistants worked collaboratively together the effects were positive. In classrooms where the assistant substituted for the teacher rather than complementing them, students, particularly those from disadvantaged backgrounds, tended to perform worse than peers taught only by a teacher.

Since 2011, the Education Endowment Foundation has run six randomised controlled trials testing the impact of giving teaching assistants quality support and training in delivering structured sessions to small groups or individuals. The results showed that students of the trained teaching assistants made three to four months more progress than students whose assistants were deployed as usual. At relatively little additional cost, teaching assistants who are used effectively can have a marked impact on student learning.

However, meta-analyses and randomised controlled trials are not always the best methods. The choice of research methods should be based on assessment of which method is most fit for the research purpose. Furthermore, analysis of the impact of an initiative or the effect of an implementation strategy should be accompanied by analysis of why and how it works, to

shed light on for whom, and under what circumstances, the initiative works. Process evaluations, run in parallel with trials, are an approach to gathering this valuable information.

Action is required to improve evidence creation

High-quality evidence needs to be created

Co-operative policy leadership is important

Implementation of high-quality research requires co-operative policy leadership by the Australian, state and territory governments. COAG has already recognised the need for co-operative leadership. In the 2013 *National Educational Reform Agreement*, governments agreed to work together to develop, publish and disseminate evidence on what works best in schools, including by researching, sharing and evaluating improvement and innovation strategies. This agreement needs to translate into action. Although governments do facilitate some of this type of research, it is insufficient and is often not conducted using rigorous evaluations, subject to independent review nor shared openly.

Strategically-guided evaluative research

National research priorities are used in other sectors in Australia. In vocational education and training (VET), the first national research strategy was published in 1997 to ensure that the findings of VET research support stakeholders in the VET system to make better decisions, and thereby improve the quality and effectiveness of training. Research funding allocations are still guided by national research priorities. Similarly, in housing, research priorities guide the research program administered by the government-funded Australian Housing and Urban Research Institute.

National priorities for ECEC and school research that emphasise research on what works best, for whom and in what circumstances should be developed (evaluative research). This type of research would include evaluation of ways to improve the adoption and adaptation of the evidence in ECEC services, schools and classrooms. That is, research is also needed to evaluate how to turn best practice into common practice in ECEC and schools.

This strategically-guided research would not displace education research undertaken through other channels. Rather, it would complement that research and focus effort directly on meeting the need of governments and the education system to build an Australian evidence base about what does and what does not work.

Commissioning high-quality research

A rigorous process should be adopted for project selection, including the provision of guidelines to applicants about the nature of research that will be considered. The guidelines should require assessment of initiatives' cost-effectiveness. The choice of research projects to build the evidence about what works best to improve outcomes also needs to be prioritised on the basis of cost-effectiveness. Process evaluations that assess how and why an initiative is or is not successful should also be commissioned.

Verifying the quality of the research

A range of processes can be used to ensure the findings from completed research are robust. These include independent validation of the findings, peer review of research, publication of all outputs to enable scrutiny and debate (irrespective of findings), and the provision of project data for secondary analysis.

Research commissioning bodies in other sectors in Australia, like the National Centre for Vocational Education and Training and the Australian Housing and Urban Research Institute use some of these processes.

Verification should extend to ensuring that research findings from small scale trials apply when initiatives are scaled up through adoption of a staged process including pilot, efficacy and effectiveness trials. It is equally important to know which programs and practices are demonstrated to be ineffective. Classroom and educator time is precious. It is important that things that do not work make way for things that do. For this reason, it is essential that all research findings are completely open and transparent.

Developing capacity in quality research

The limited research activity on what works best to improve outcomes in the Australian context suggests that Australia will need to foster research capacity in high-quality education research. Strategies should be put in place to build this capacity and include a focus on how researchers, policy makers, ECEC services, schools and educators can work constructively and in partnership to evaluate what works best. Without the positive and active engagement of school systems, education providers, ECEC service managers, principals and educators, there is a high risk that research will fail to make a difference to outcomes in ECEC services, schools and classrooms, and ultimately fail to contribute to an improvement in national outcomes.

Action is required to take high-quality evidence and implement it as practice

Evidence must influence practice

Simply creating evidence about what works best is not enough. Building understanding of how best to go about implementing best practice on the ground is as important as evaluating what works best.

Evidence only leads to improved education outcomes if it is influential in changing the behaviour of decision makers. Educators need to know how they can adopt and adapt the evidence into their practices.

Research is also needed into how best to improve the use of evidence by policy makers.

Internationally, concerns that evidence does not sufficiently impact decision making have prompted research on how to mobilise knowledge and translate evidence into policy and practice. The UK Education Endowment Foundation is funding research into ways to engage and support schools in their adoption and adaptation of the effective practices identified in the UK evidence base on what works. Similarly, in the United States, the Carnegie Foundation is investing in ways of improving the use of, and culture of using, evidence in education settings.

Partnerships with research institutions, schools and the teaching professions play an important role in this process. It is important to get buy-in and ownership from schools and educators.

Research into understanding how to translate what works best into best practice in ECEC services, schools and classrooms is likely to have widespread implications for the way researchers communicate their findings, the way educators are trained (including through professional development), and how education policy is designed. It will also help ensure that spending on both education and education research is delivering value for money.

Research findings must be translated and communicated effectively

In order for research to have an impact on decision makers in the education system, findings have to be translated and communicated effectively. Vast quantities of information are available through the internet. Identifying high-quality research and the key findings from that work is a challenge for many decision makers. To address this, a central repository of trusted, high-quality evidence, including resources (such as guidelines and toolkits) to support practitioners in adopting and adapting the information into their practices, is needed.

The US Institute of Education Sciences manages a repository of this type — the What Works Clearinghouse. The Clearinghouse reviews research on policies, programs, practices and products in education. High-quality evidence is summarised in effectiveness ratings for

different interventions and practice guides. The *Teaching and Learning Toolkit*, supported by Social Ventures Australia, is a recent example of a move in this direction in Australia.

Effecting change will take time

It will take time to identify research priorities, commission and complete evaluation projects, translate and communicate research findings and turn best practice into common practice. And it will take a further period of time before the impacts become apparent in nationally reported outcomes — a period significantly longer than the cycles of typical education funding agreements.

Governance and institutional arrangements

The framework set out above for further developing a national education evidence base is not the end of the journey. Effective governance and institutional arrangements are important to create strong incentives for delivery of an effective education evidence base.

Such arrangements do this by ensuring that responsibility for the functions and tasks associated with implementing the framework are clearly assigned, thereby promoting accountability. The discussion below relates to the bottom-up approach. Effective arrangements for the top-down approach in school education, undertaken by the Australian Curriculum, Assessment and Reporting Authority (ACARA), are already in place.

The Australian, state and territory governments should lead the way

A National Education Evaluation Agreement is needed

In Australia's federated system, the funding and delivery of education services (both ECEC and school) are dispersed between the tiers of government. In this fragmented operating environment it is important that all governments commit to implementation to get the maximum benefits from the bottom-up approach. This should be demonstrated through creation of a *National Education Evaluation Agreement*.

This Agreement would be in addition to, and separate from, existing agreements. Policy makers, researchers, and educators should view the bottom-up approach through the lens of how to go about improving outcomes rather than through the top-down perspective of informing judgements about their performance. In this way, incentives are created for all stakeholders to embrace and engage with the evidence-based approach. Therefore, it is desirable to decouple the implementation of the bottom-up approach from the focus on performance monitoring, benchmarking, and accountability (top-down approach).

In establishing the Agreement, governments should apply principles of good governance by:

- setting clear policy objectives
- providing policy guidelines and defining the functions of the entity responsible for delivering on the national education evidence base framework
- ensuring that all parties have clearly defined roles and a clear understanding of their responsibilities, and operate in an open and transparent manner
- ensuring the entity has resourcing and capability to carry out its functions effectively.

Functions of the National Education Evaluation Agreement

The Agreement should provide explicit policy direction in defining the:

- objectives of the Agreement
- nature of the research to be undertaken in the bottom-up evaluation of what works and what does not work, including research on the best implementation strategies, process evaluation and assessment of cost-effectiveness
- evidentiary standards or frameworks to be applied, and quality verification processes
- imperative to ensure effective translation and communication of evidence (including the existing stock of high-quality evidence), and its practical application, including through guidelines accessible to practitioners.

An institution to deliver the bottom-up approach

Functions of the institution

An institution should be assigned responsibility for performing the functions needed to deliver on the bottom-up approach. The institution should be responsible for the following five activities:

- development of research priorities
- commissioning of high-quality education research
- adoption of rigorous research quality control processes
- development of researcher capacity
- translation, communication and implementation of high-quality evidence.

In addition, the institution should be responsible for:

- promoting a culture among policy makers and educators of applying the evidence base
- establishing co-operative partnerships between research institutes, schools and ECEC providers, and educators, as a means to achieve engagement and buy-in

-
- establishing co-operative partnerships with private philanthropic organisations, both in Australia and overseas, to leverage the growing interest and support for generating and applying high-quality evidence in education
 - keeping researchers informed about potentially useful administrative and research datasets.

The institution would not do research on its own account.

The Australian, state and territory governments would collectively own and resource the institution, ensuring that it has the capability to undertake its functions. But, to deliver on its functions, there is a strong case for the institution to be at arms' length from government departments responsible for ECEC services and schools.

In considering which institution would best perform the functions set out above, the Commission has considered three options: ACARA; the Australian Institute for Teaching and School Leadership (AITSL); and a new, privately run institution created through a competitive tender process, similar to the way in which the UK Education Endowment Foundation was established.

Assessment of options for housing the institution

The Commission has not undertaken a detailed analysis of the three options, but rather has assessed each potential home for the institution against characteristics desirable for the institution to have (table 1).

On this assessment, the private entity has a clear advantage over both ACARA and AITSL in terms of being able to leverage funding from philanthropic and corporate sponsors, but it compares either equally well or less favourably against the other characteristics. In particular, ACARA and AITSL have an advantage over the private entity in the critical areas of accountability to the Education Council. ACARA has an advantage over both AITSL and the private entity in terms of the costs relating to establishing the institution.

AITSL has similar strengths and weaknesses to ACARA, except that it is currently a company owned by the Australian Government and would require more complex legislative changes to convert it into an authority like ACARA, which is owned by the Education Council. ACARA has proven to be a successful model for governments in implementing the top-down approach, and this can be built upon in implementing the bottom-up approach.

On balance, the Commission considers the best starting point for delivery on the bottom-up approach is to embed the institution within ACARA.

Table 1 Assessment of ACARA, AITSL and a private entity against desirable characteristics for the institution

<i>Desirable characteristics [ideal rating]</i>	<i>ACARA</i>	<i>AITSL</i>	<i>Private entity</i>
Degree of independence in day-to-day operations from the Education Council [high]	high	high	high
Degree of accountability to the Education Council [high]	high	high	medium
Degree of openness and transparency [high]	high	high	high
Scope to raise direct funding (donations) from private philanthropic and corporate sponsors [high]	low	low	high
Scope to leverage external funding for individual evaluation projects [high]	medium	medium	medium
Capacity to enter into partnerships with government organisations, schools, ECEC service providers, educators and research institutes [high]	high	high	high
Cost of establishing the institutional setup [low]	low	medium	medium
Ongoing cost of operating the institution [low]	medium	medium	medium
Scope to manage risks arising from conflicts of interest between the existing and new functions of the organisation [high]	medium	medium	not applicable

Governance arrangements for ACARA

There are a number of implementation issues that need attention in assigning the new functions to ACARA.

There may be a potential or perceived conflict of interest with ACARA’s existing functions. For example, a bottom-up evaluation could raise questions about an aspect of ACARA’s top-down functions. Furthermore, stakeholders might perceive that the top-down and bottom-up approaches have not been decoupled and could be less willing to engage with ACARA on one or both of them.

To deal with these issues there should be structural separation between the bottom-up and top-down functions. Separate divisions should be responsible for each approach.

The Commission recommends the following governance arrangements.

- The new bottom-up division would have its own independent board and chairperson, with board members appointed by the Education Council through a transparent selection process, and in their own right, not in a representative capacity. The CEO of ACARA could be an ex-officio member of both boards.
- A charter and letter of expectation from the Education Council — to set strategic directions and provide guidance about the activities that the new division of ACARA is expected to undertake.

-
- The Education Council would have veto power in the selection of research projects, but would use this in an open and transparent way (such as in writing).
 - To strengthen the independence of the board and to improve transparency, the board members would not include public servants from education and ECEC departments, nor serving officers from the non-government education sectors. Consultation with stakeholders would be facilitated through the establishment of formal advisory bodies which would also include representatives of other groups, including schools, ECEC services, educators, parents and researchers.
 - The Education Council would commission a review of the bottom-up arrangements by an independent reviewer every five years.

ACARA would provide the back office functions for the new activities, leveraging economies of scale. There would also be synergies from being able to move staff flexibly between the two divisions of the institution.

Changes to ACARA's functions would need to be legislated through changes to its Act.

Funding the bottom-up approach

The cost of implementing the bottom-up approach is expected to be met from within the existing education budget envelope (and funded by all governments). The Commission anticipates that the cost will be small, relative to the recurrent education budget.

Governments should commit to funding the bottom-up approach for at least ten years. This commitment would enable ACARA to work with some certainty in implementing the bottom-up approach, in developing partnerships with other institutions and in commissioning research that is long-term in nature. It would also enable time for the impacts of efforts to implement best practice to emerge. ACARA's capacity to work with certainty would be even stronger if funding was provided as an upfront endowment.

Recommendations and findings

FINDING 1.1

Notwithstanding increases in expenditure on education per student over the past decade, national and international assessments of student achievement in Australia thus far show little improvement and in some areas standards have dropped.

RECOMMENDATION 2.1

In supporting the further development of a national education evidence base, governments should be guided by the following principles.

The national education evidence base should:

- meet the varied needs of decision makers at all levels of the education system
- provide high-quality data and evidence to inform decisions
- drive improved student achievement through four interconnected processes — monitoring of performance, evaluation of what works best, translation and communication of evidence, and practical application of that evidence by educators and policy makers
- generate benefits in excess of the costs incurred in collecting and processing data and in creating, sharing and using evidence.

FINDING 2.1

National level data play a key role in top-down monitoring, benchmarking and accountability processes, but alone are insufficient to achieve improved outcomes. They need to be complemented by a bottom-up approach that generates, translates and communicates evidence about:

- what works best, for whom and in what circumstances
- the most effective strategies for implementing best practice in schools and early childhood education and care services.

RECOMMENDATION 3.1

In assessing whether to improve the quality of existing education data, governments should examine on a case-by-case basis whether:

- the existing quality of the data is fit for purpose
- data quality improvements are feasible given the context of data collection
- other options are available
- the benefits of improving data quality exceed the costs.

RECOMMENDATION 3.2

The Australian Government should request and sufficiently fund the agencies that conduct the *Longitudinal Study of Australian Children* to establish new cohorts at regular intervals. The agencies should use opportunities to link with administrative data and draw on the experience gained from use of the original study.

FINDING 3.1

There are gaps in existing data collections, but ongoing initiatives should help to fill many of them.

- The Australian Government's proposal for a national Year 1 assessment should help to better assess performance of early school skills and to identify students who need early intervention on a nationally consistent basis.
- Work by the Australian Curriculum, Assessment and Reporting Authority, the Victorian Curriculum and Assessment Authority and relevant research institutes should help to improve methods and metrics for measuring non-cognitive outcomes and wellbeing.
- The *Nationally Consistent Collection of Data on School Students with Disability* should help teachers and education systems to better support students with disability.
- The development of a national minimum teacher dataset by the Australian Institute for Teaching and School Leadership should help to support workforce planning and assessment of initial teacher education.

RECOMMENDATION 3.3

Australian, state and territory governments should support greater use of value-added measures of education outcomes.

FINDING 3.2

The two largest gaps in the national education evidence base are evidence about:

- the impact of policies, programs and education practices in Australian schools and early childhood education and care services
- the most effective implementation strategies for turning best practice into common practice.

RECOMMENDATION 4.1

The Australian, state and territory governments should prioritise the work of the Data Strategy Group to develop a nationally consistent system of unique student identifiers. In doing so, governments should ensure that the resulting system:

- minimises implementation costs, by building on existing jurisdictional, school and school system student identification management systems and processes, and by taking advantage of scheduled technological upgrades
- proactively manages privacy and data security concerns, including through the preparation of a Privacy Impact Assessment early in the planning process.

Further, the Data Strategy Group should examine and develop feasible ways of extending a unique student identifier to the early childhood education and care sector.

RECOMMENDATION 4.2

Agencies responsible for collecting education data should review and adjust their procedures to reduce the administration costs and compliance burden on respondents, including by:

- removing duplication in data collection and processing
- avoiding frequent changes to reporting requirements, but when changes are necessary, allowing sufficient time for respondents to comply with the new requirements
- using census data collections to maintain a basic national set of student administrative and performance data, and sample data collections to enable more in-depth research and analysis on specific matters
- making maximum use of existing large-scale assessments for research and evaluation purposes by linking sample data to census data where possible.

FINDING 5.1

There is a considerable amount of education and other relevant data already collected, but there are major impediments to its access and use.

RECOMMENDATION 5.1

In circumstances where formal consent and notification processes would allow personal information to be used and disclosed for education research, agencies responsible for education data collections should amend their processes for collecting personal information from parents/guardians to incorporate formal consent and notification procedures at the initial point of collection.

RECOMMENDATION 5.2

The Australian Government should amend the *Privacy Act 1998* (Cwlth) to extend the exception relating to the collection, use or disclosure of personal information in the area of health and medical research to cover public interest research more generally.

RECOMMENDATION 5.3

The ACT Government should enact in its privacy law an exception to cover public interest research. In Western Australia and South Australia where there is not a legislated privacy regime, their privacy arrangements should reflect a similar exception for public interest research.

RECOMMENDATION 5.4

The Australian, state and territory governments should pursue legislative consistency in education and related Acts regulating the use and disclosure of education information to facilitate improved access to data for public interest research.

RECOMMENDATION 5.5

The Australian, state and territory governments should introduce policy guidelines which give explicit permission to data custodians to share data to facilitate public interest research. Those guidelines should include timeframes, conditions for release, criteria for decision making, reasons for decisions and review procedures.

FINDING 6.1

The system of data linkage would be improved if linked data were retained and a national education master linkage key developed.

RECOMMENDATION 7.1

The Australian, state and territory governments should ensure that a single online register of education data collections and their associated metadata is created.

FINDING 7.1

The value of education evidence will only be realised if it is translated into common practice. Developing the evidence base on how best to support the use of evidence to turn best practice into common practice, is as important as evaluating the impact of policies, programs and practices on student outcomes.

RECOMMENDATION 7.2

The Australian, state and territory governments should pursue a national policy effort to develop a high-quality and relevant Australian evidence base about what works best to improve early childhood and school education outcomes and to support the use of that evidence. In particular, five activities need to be supported:

- development of research priorities
- commissioning of high-quality education research
- adoption of rigorous research quality control processes
- development of researcher capacity
- translation, communication and implementation of high-quality evidence.

RECOMMENDATION 8.1

The Australian, state and territory governments should task the COAG Education Council to provide explicit policy direction through a *National Education Evaluation Agreement*, which would define the:

- objectives of the agreement
- nature of the research to be undertaken in the bottom-up evaluation of what works and what does not work, including research on the best implementation strategies
- evidentiary standards or frameworks to be applied, including process evaluation and assessment of cost-effectiveness
- requirements for translation and communication of evidence (including implementation strategies).

They should also request the Education Council to:

- assign the Australian Curriculum, Assessment and Reporting Authority (ACARA) to be responsible and accountable for implementation of the functions set out above and in Recommendation 7.2
- specify ACARA's expanded governance arrangements, functions and operations including:
 - responsibility for promoting a culture of using the evidence base by policy makers and educators
 - scope for co-operative partnerships between research institutes, system managers, schools, early childhood education providers and educators
 - scope for co-operative partnerships with private philanthropic organisations, both in Australia and overseas, to leverage the growing interest and support for high-quality work in this area.

The Australian Government should legislate the changes to ACARA's Act.

1 About this inquiry

Key points

- Early childhood development and school education policy bear on the wellbeing and quality of life of young Australians as well as on the capabilities and productivity of Australia's future labour force.
- Notwithstanding increases in expenditure per student on education over the past decade, national and international performance metrics in Australia show little improvement, and in some areas standards of achievement have dropped.
- An evidence-based approach to education policy and to school and classroom practices is essential for improving the performance of the education system, and for gaining the most value from Australia's substantial investment in education.
- Early childhood education and care (ECEC) and school education in Australia are characterised by shared national objectives and considerable diversity among schools and ECEC providers. Schools and ECEC providers differ in terms of size, location, sector and management type, the nature of services they provide and the communities they serve.
- In this report, consideration is given to the data collections needed, how they are used to establish an evidence base and how the evidence is translated and applied in schools and early learning centres. The discussion takes into account the diversity in service providers and in Australia's youth as well as the costs and benefits of different options.
- The focus of this inquiry is on developing an education evidence-based policy capability, and embedding evidence-based decision making in education policies, programs and practices.
- The Commission has not reviewed the funding arrangements for schools and ECEC services, nor has it reviewed the education evidence base itself.

This chapter sets out the context for the inquiry, what the Commission was asked to do and how the inquiry was conducted. To frame the goals of a national education evidence base capability, an overview is provided of Australia's early childhood education and care (ECEC) and school education policy objectives. Also highlighted are the characteristics of the education sector that affect the development of an effective evidence base.

1.1 Australia's education system

Australia's education system plays a vital role in developing the human capital and social wellbeing of the country. The future economy will require higher levels of education, as jobs with lower education and skills requirements are falling both as a proportion and in absolute terms (PC 2013b). Education contributes to young Australians' economic and social wellbeing, and helps reduce the effects of socioeconomic disadvantage

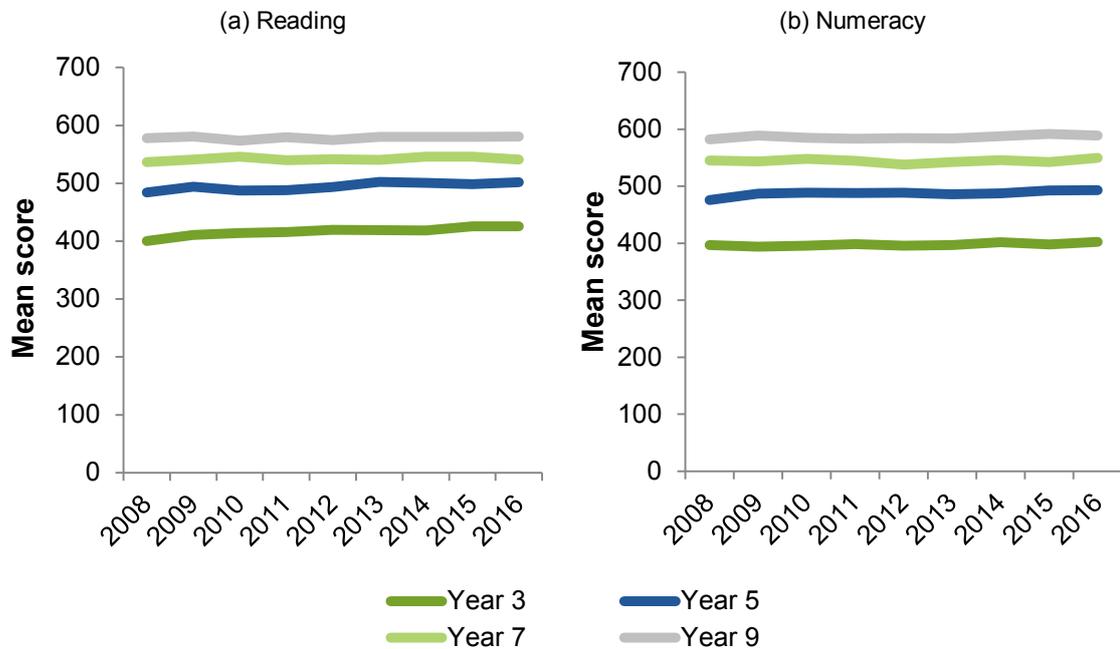
(MCEETYA 2008). The value of early learning, beyond its utility in supporting parents' workforce participation, has similarly been recognised (ECA 2016a; PC 2014a; Sylva et al. 2010).

Australians are increasing their level of educational attainment. In the decade to 2015, school retention to Year 12 increased by nearly 10 percentage points (ABS 2008, 2016f), and the proportion of Australians aged 25–64 years with a bachelor's degree or higher qualification increased from 23 per cent to 31 per cent (ABS 2015b). However, equipping young Australians for active participation in an increasingly complex global economy and society requires more than just increasing education attainment (highest level of schooling). It also requires raising education achievement, so that all children and young people have the skills, knowledge and attributes they need to be successful in life and work. This includes improving achievement in key capabilities such as literacy, numeracy, science and technology (Masters 2016).

Recognising this challenge, Australian governments have committed to national education goals that emphasise the importance of excellence and equity in Australia's education system (MCEETYA 2008). In seeking to achieve these goals, Australian governments — like those in other developed nations — have increased investment in education and implemented large-scale education reforms with a focus on 'test-based accountability', transparency and reporting against national standards (DEEWR 2010, p. 3). The aim has been to drive increased competition between schools, as a means of achieving improvements in school quality and hence, gains in education outcomes. Reforms have included the introduction of a national curriculum, the *National Assessment Program — Literacy and Numeracy* (NAPLAN), *My School*, and the *Smarter Schools National Partnerships* (DEEWR 2010).

However, while Australia continues to have a robust education system, there are indications that further work is needed. Real government expenditure on schools increased by 24 per cent (from \$40.7 billion to \$50.4 billion) between 2004-05 and 2013-14, or almost 14 per cent per student across government and non-government schools (SCRGSP 2016a). Despite this increase in expenditure, Australia's performance on national and international student assessments has stalled or, in some cases, declined. For example, Australian students' mathematical literacy and reading performance (as measured by the *Programme for International Student Assessment* (PISA)), dropped by 29 points and 16 points, respectively, between 2000 and 2012 (Masters 2016). NAPLAN measures of Australian students' reading and numeracy achievement indicate little improvement between 2008 and 2015 (ACARA 2015d) (figure 1.1). Also of concern are early childhood development metrics that show that one-fifth of Australian children are developmentally vulnerable when they begin full-time schooling (DET 2016b).

Figure 1.1 **NAPLAN measures of reading and numeracy achievement are broadly unchanged^a**
2008 to 2016

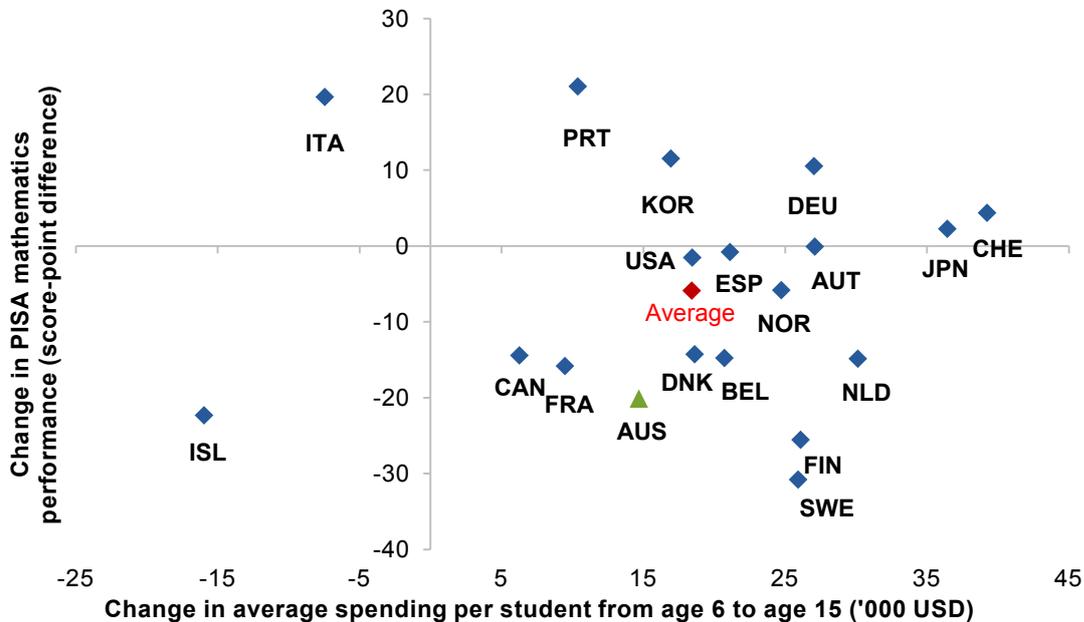


^a Average scores on the reading and numeracy components of the *National Assessment Program — Literacy and Numeracy*.

Sources: ACARA (2016m, 2016o).

Australia is not alone in facing these challenges. Many OECD countries have increased their expenditure on education since 2000 (Barber and Mourshed 2007). Yet in most cases this increased expenditure has not translated into improved performance on international student assessments. For example, increased per-student expenditure by OECD countries on school education does not appear to be reflected in increased PISA mathematics scores (figure 1.2).

Figure 1.2 Change in average cumulative per-student expenditure^a and in PISA mathematics performance^b
2003 to 2012, selected OECD countries^c



^a Change in cumulative expenditure by education institutions per student from age 6 to age 15 years, in equivalent US dollars converted using purchasing power parities. ^b Score-point difference on the mathematics component of the *Programme for International Student Assessment (PISA)* of 15-year-olds. 2015 PISA data are due to be released on 6 December 2016. ^c Countries included: Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Iceland (ISL), Italy (ITA), Japan (JPN), Korea (KOR), Netherlands (NLD), Norway (NOR), Portugal (PRT), Spain (ESP), Sweden (SWE), Switzerland (CHE) and United States (USA).

Source: OECD (2013a).

Such trends have prompted a growing recognition, both in Australia and overseas, that ‘excellence in education requires more than money’ (OECD 2013a, p. 42). This is not to say that funding does not matter, but rather that increasing expenditure alone does not guarantee an improvement in outcomes. There is now also broad agreement that monitoring, benchmarking and accountability alone, are insufficient to achieve gains in education outcomes. These processes must be complemented by the use of data and evidence to identify and implement the most effective programs, policies and practices. This will help to allocate resources more effectively and improve outcomes with respect to national education objectives.

This report is about seeking ways to address the challenge of what data to collect and how to use it to support the generation of evidence about what works best in education, and the application of this evidence to inform decision making. It does not review the funding arrangements for ECEC and schools.

FINDING 1.1

Notwithstanding increases in expenditure on education per student over the past decade, national and international assessments of student achievement in Australia thus far show little improvement and in some areas standards have dropped.

Education in Australia is a shared responsibility

ECEC and school education are generally delivered by state, territory and local governments and the non-government sector. Funding is provided by the Australian, state and territory governments and family contributions. Reflecting this, education policy is developed and implemented through co-operation between the Australian, state and territory governments, under the auspices of the Council of Australian Governments (COAG) and the Education Council (which comprises all education ministers). Chapter 8 gives a more detailed discussion of these institutional arrangements and responsibilities.

The past decade has seen increasing co-operation between the Australian, state and territory governments to develop shared education objectives, policy frameworks and partnerships. This has included the development of:

- the *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA 2008) (box 1.1)
- the *National Education Agreement* (COAG 2009b) and *National Education Reform Agreement* (COAG 2013) (box 1.2)
- the *Smarter Schools National Partnerships and School Performance Improvement Frameworks Project* (DEEWR 2010)
- a national curriculum for schools, the *Australian Curriculum*, and national assessment and reporting programs for student and school performance (ACARA 2012)
- national quality standards and regulations for ECEC services, the *National Quality Framework for Early Childhood Education and Care* (*National Quality Framework*, or NQF) (ACECQA 2013b).

Box 1.1 Shared policy objectives — Melbourne Declaration

The *Melbourne Declaration on Educational Goals for Young Australians* (Melbourne Declaration), endorsed by all Australian education ministers in 2008, sets out two overarching goals for school and early childhood education and care.

Goal 1: Australian schooling promotes equity and excellence

This goal aims for all young Australians to have access to education that is:

- equitable — including reducing the disparity in education outcomes between Indigenous and non-Indigenous children and young people, and reducing the effect of socioeconomic and other sources of disadvantage on education outcomes
- high-quality — including providing challenging learning experiences that enable all children and young people to fulfil their individual potential.

Goal 2: All young Australians become successful learners, confident and creative individuals and active and informed citizens

This goal aims for all young Australians to become:

- successful learners — including having essential skills in literacy, numeracy and information and communications technology, and capabilities such as problem solving and collaboration
- confident and creative individuals — including maintaining physical and emotional wellbeing, and developing the knowledge, skills and values needed to lead healthy, satisfying lives
- active and informed citizens — including the capacity and commitment to participate in civic life, to appreciate diversity and to relate well cross-culturally.

Source: MCEETYA (2008).

Early childhood education and care

Responsibility for ECEC is shared between the Australian, state and territory governments. In addition to parent contributions, government funding for childcare is almost entirely provided by the Australian Government, whereas preschool services are funded by a mixture of Australian, state and territory government contributions (SCRGSP 2016a).

State and territory governments provide legislative and regulatory frameworks for ECEC services in their jurisdiction. Their responsibilities vary by jurisdiction, but generally include:

- providing preschool services
- approving or licensing, monitoring, assessing and rating ECEC services under the NQF
- licensing or registering services not approved under the NQF (SCRGSP 2016a).

In 2014-15, the Australian, state and territory governments spent a combined \$8.6 billion on ECEC services (recurrent and capital expenditure). This consisted of:

- Australian government expenditure of \$7.1 billion (excluding funding provided to states and territories for universal access to preschool services)
- State and territory government expenditure of \$1.5 billion, of which \$1.4 billion was spent on preschool services (and includes universal access funding provided by the Australian Government) (SCRGSP 2016a).

The Australian Government also funds the *Australian Early Development Census*, a triennial national census of the developmental outcomes of children in the first year of full-time schooling, at a cost of approximately \$28 million per collection cycle (Brinkman et al. 2014).

Schools

The Australian, state and territory governments share policy responsibility for school education. However, services are delivered by state and territory governments and non-government providers. State and territory governments' responsibilities include:

- ensuring that all school-aged children have the opportunity to enrol in a safe, supportive school providing a high-quality education
- ensuring that all children of compulsory school age attend school
- developing policy, delivering services, regulating schools, and monitoring and reviewing the performance of individual schools
- developing and implementing the regulatory framework for all schools (government and non-government), including registration and accreditation, school quality and performance in education outcomes
- implementing the national curriculum
- administering government schools (COAG 2009b).

Government schools are primarily funded by the state and territory governments, but also receive some Australian government funding. Non-government schools receive most of their public funding from the Australian Government, with the remainder sourced from private fees and fundraising (SCRGSP 2016a).

In 2015-16, total Australian government school education-related funding was approximately \$16.3 billion, almost all of which consisted of school funding under the *Students First* program (which sets out current Australian government policy directions in school education) (Treasury 2016b). Almost \$9.9 billion of school funding was paid to non-government schools (Treasury 2016b).

Box 1.2 Shared policy objectives — national education agreements

The *National Education Agreement* and *National Education Reform Agreement* were endorsed by the Australian, state and territory governments through the Council of Australian Governments (COAG) in 2009 and 2013 respectively. These agreements set out general objectives (which they term ‘outcomes’) and ‘COAG Targets’.

Objectives of the agreements

The *National Education Agreement* (COAG 2009b) aims for Australian schooling to provide a high-quality and equitable education for all students, so that:

- all children and young people are engaged in and benefiting from schooling
- children and young people are meeting basic literacy and numeracy standards, and overall levels of literacy and numeracy achievement are improving
- Australian students excel by international standards
- schooling promotes social inclusion and reduces educational disadvantage in children and young people, especially Indigenous Australians
- young people make a successful transition from school to work and further study.

The *National Education Reform Agreement* (COAG 2013) presents similar objectives.

COAG Targets

The *National Education Agreement* and *National Education Reform Agreement* also present the specific objectives (‘targets’) to:

- lift the Year 12 (or equivalent) or Certificate III attainment rate to 90 per cent by 2020
- at least halve the gap for Indigenous students in Year 12 (or equivalent) attainment rates by 2020, from the 2006 baseline
- halve the gap for Indigenous students in reading, writing and numeracy by 2018, from the 2008 baseline.

In addition to these, the *National Education Reform Agreement* presents objectives (‘targets’) with respect to Australia’s international performance. These aim for Australia to:

- be placed in the top 5 countries internationally in reading, mathematics and science by 2025
- be considered to have a high-quality and high-equity school system by international standards by 2025.

In the 2016-17 Budget, the Australian Government announced an additional \$118 million in funding for students with disability between 2016 and 2018, targeted to schools identified as being in greatest need (Treasury 2016a). The Australian Government has also allocated an additional \$1.2 billion in school funding to occur between 2018 and 2020, contingent on state and territory governments and non-government schools implementing initiatives aimed at improving education outcomes (box 1.3).

Box 1.3 Reforms tied to increased Australian government school funding

Under the 2016-17 Budget, additional funding of \$1.2 billion from 2018 to 2020 will be tied to a needs-based distribution of funding and a range of school reforms aimed at improving education outcomes.

Among the initiatives tied to the funding increase are:

- standardised testing of Year 1 students' reading, phonics and numeracy skills
- annual reports to parents identifying students' literacy and numeracy attainment against national standards
- recruitment targets for teachers qualified in science, technology, engineering or mathematics subjects
- teacher salary progression to be linked to demonstrated competency and achievement against the Australian Professional Standards for Teachers, rather than just length of service.

Source: Birmingham (2016).

The following two subsections provide overviews of ECEC and school education in Australia, in terms of their objectives and characteristics that may affect the development of a robust and effective evidence base.

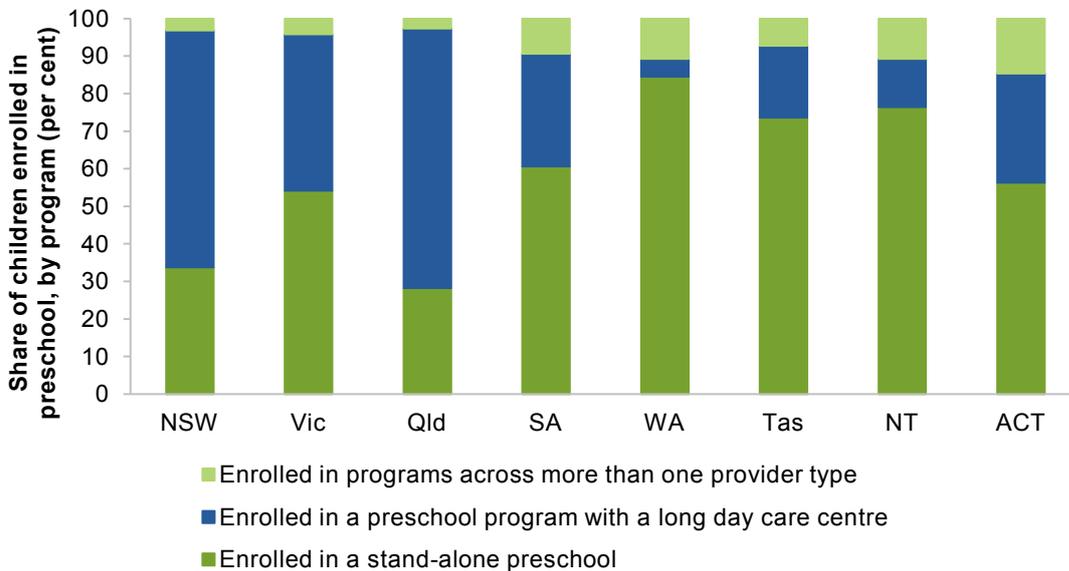
Early childhood education and care

The ECEC sector in Australia is diverse, encompassing many different types of services, providers and settings. Broadly, formal ECEC includes childcare and preschool services, defined in this report as follows:

- 'childcare' refers to formal childcare services provided to children aged 0–12 years, which include long day care, family day care, outside school hours care, occasional care and other care (SCRGSP 2016a)
- 'preschool' is defined as a structured, play-based learning program delivered to children by a degree-qualified early childhood teacher, mainly in the year or two before children begin full-time schooling. Preschool programs are delivered in a variety of settings, including stand-alone preschools, long day care centres and co-located with schools (ABS 2016c).

Participation in ECEC services is voluntary. Some children do not participate in any ECEC services, while others may attend multiple services, or move between different services and provider types. Of the approximately 300 000 children attending preschool in 2015, almost half were enrolled in a preschool program within a long day care centre, and about 5 per cent were enrolled in programs across more than one service provider type (ABS 2016d), though this varies across states and territories (figure 1.3).

Figure 1.3 Children enrolled in a preschool program in the year before full-time school, 2015
By jurisdiction and provider type^{a,b}



^a Excludes children aged 5 years old who were enrolled in preschool in the previous year as a 4 year old.
^b Care needs to be taken when interpreting Queensland child counts as there may be some duplication of children across different provider types. This is due to the inclusion of child aggregate data from some service providers.

Source: ABS (*Preschool Education, Australia, 2015*, Cat. no. 4240.0).

ECEC providers vary considerably in size and in the number of services they operate. About 15 000 ECEC services are operating across Australia, representing over 7400 NQF-approved providers (ACECQA 2016b). Most (83 per cent) ECEC providers are ‘small’, operating only one ECEC service. ECEC providers also vary in management type, such as private for-profit, community-managed or local government-managed providers (ACECQA 2016b).

The complexity of children’s participation in ECEC, and the diversity of services and providers, have implications for the costs of collecting, processing and reporting education data (chapter 4). The division of responsibilities between multiple levels of government can also pose challenges for collecting consistent and comparable data on children’s participation in ECEC services. Issues relating to data quality are discussed in chapter 3, while issues regarding data sharing and access are examined in chapter 5.

Objectives of early childhood education and care

‘Early learning’ refers to children’s physical, cognitive, linguistic, social and emotional development and learning from birth to five years. Early learning occurs in both formal ECEC settings and informal settings, such as the home environment and community playgroups (ECA 2016a). ECEC services aim to support children’s development, learning and quality of life in the present as well as forming a foundation for later learning in the school years and beyond (DEEWR 2009). Research indicates that early childhood development is an important predictor of children’s future education outcomes, as well as their behaviour, health and wellbeing in later life (DET 2016b). Children’s development and learning in ECEC can assist in explaining subsequent school outcomes, and are also important outcomes in their own right (box 1.4).

Box 1.4 ‘Care’ and ‘education’ in early childhood education and care

A distinction is sometimes made between the ‘care’ and ‘education’ roles of early childhood education and care (ECEC) services, usually along the lines of viewing childcare services as mainly providing care and preschool services as mainly for promoting children’s development and learning. This distinction has likely arisen because the childcare system was developed mainly to support parents’ workforce participation, whereas preschool programs have generally been developed to support children’s development and learning (PwC 2011).

However, the inclusion of both childcare and preschool under the rubric of ECEC, as reflected in national ECEC policy documents, can be seen as a recognition that the two roles are interconnected and that ‘learning is a part of every child’s development from birth’ (McMeniman 2008, p. 12).

Neither the *National Quality Framework* (ACECQA 2013b) nor the *Early Years Learning Framework* (DEEWR 2009) distinguish between childcare and preschool services in their standards and guidelines for service providers. The *Early Years Learning Framework* aims to ensure ‘that children in all early childhood education and care settings experience quality teaching and learning’ (DEEWR 2009, p. 5). In light of this, and for the purposes of this inquiry, children’s development and learning through participation in both childcare and preschool are considered to be ‘education outcomes’ in their own right as well as predictors of subsequent school outcomes.

Recognising the importance of early learning for children’s present and future outcomes, all Australian governments have agreed to a number of policy objectives for early childhood, including ECEC services (box 1.5). These objectives aim for young children to:

- enjoy good physical, social and emotional health and wellbeing
- develop knowledge and skills for life and later learning, including cognitive and language skills as well as non-cognitive capabilities (COAG 2009a; DEEWR 2009).

Governments have also committed to the objective that all Australian children have access to affordable, quality early childhood education in the year prior to full-time schooling — defined as a program delivered by a qualified early childhood teacher for 15 hours per week or 600 hours per year (COAG 2009c, 2016).

The health-related objectives for ECEC also underline the importance of generating data and evidence on factors outside the education system that affect children’s development and learning.

Box 1.5 Policy objectives — early childhood education and care

National Early Childhood Development Strategy

Developed by Australian, state and territory governments through the Council of Australian Governments, the Strategy emphasises the importance of children’s early years for long-term individual and national outcomes. It has the objectives (or desired outcomes) that all children:

- are born and remain healthy
- are in environments that are nurturing, culturally appropriate and safe
- have the knowledge and skills for life and learning
- benefit from better social inclusion and reduced disadvantage, especially Indigenous children
- are engaged in and benefiting from educational opportunities.

National Partnership Agreement on Universal Access to Early Childhood Education

The objective of the Agreement (continuing the work of the earlier *National Partnership Agreement on Early Childhood Education*) is for all Australian children to have access to affordable, high-quality early childhood education in the year before formal schooling (‘universal access’). Specifically, this refers to a program delivered by a qualified early childhood teacher for 15 hours per week or 600 hours per year. There is a particular emphasis on access by vulnerable and disadvantaged children and Indigenous Australian children, including those living in remote communities.

Early Years Learning Framework

The Framework guides early childhood education and care providers in supporting children’s learning. It sets out five learning objectives:

- children have a strong sense of identity
- children are connected with and contribute to their world
- children have a strong sense of wellbeing
- children are confident and involved learners
- children are effective communicators.

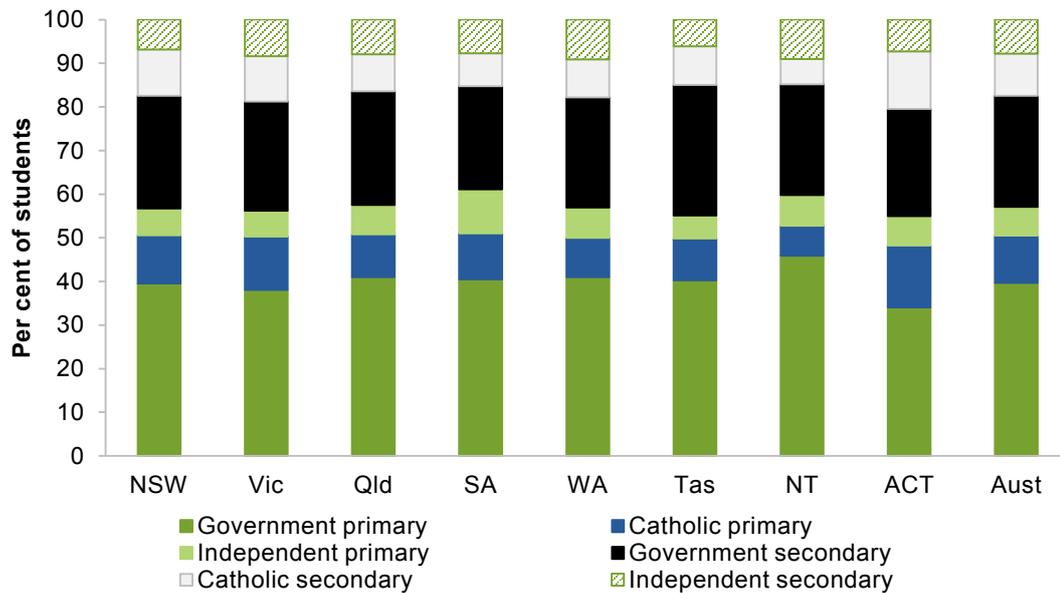
Sources: COAG (2009a, 2009c, 2016); DEEWR (2009).

School education

Full-time schooling in Australia consists of primary and secondary education from Foundation Year to Year 12, with compulsory attendance to Year 10 and voluntary

attendance in Years 11 and 12 (ABS 2016f).¹ Nationally in 2015, approximately 3.75 million students were enrolled in primary, secondary and special education schools across Australia. Of these students, about 65 per cent were enrolled in government schools, with the remainder in Catholic schools (20 per cent) and Independent schools (almost 15 per cent) (figure 1.4).

Figure 1.4 Students enrolled in Australian schools, 2015
By jurisdiction and sector



Data source: ABS (*Schools, Australia, 2015*, Cat. no. 4221.0).

As in the ECEC sector, schools in Australia are diverse: they vary greatly in terms of characteristics such as enrolment size, affiliation, geographic location, resources and facilities, and in the demographics of the families and communities they serve. For example, beyond a minimum set of state and territory regulatory requirements, Catholic and independent schools operate largely autonomously from governments (DPMC 2014). Most Catholic schools are systemic schools, owned by the Catholic Church in Australia and operated by Catholic Education offices in each diocese, whereas most Independent schools are non-systemic, being governed and operated on an individual basis (Buckingham and Jha 2016; PC 2012). Many Independent schools are also small, with 38 per cent having fewer than 200 students, and 11 per cent of these having fewer than 50 students (ISCA, sub. 39).

¹ States and territories differ in the names given to preschool and the first year of full-time schooling (the year before Year 1), as well as the respective starting ages for these stages in education. For consistency, this report uses the terms ‘preschool’ and ‘Foundation Year’ (or ‘the first year of full-time school’), with the latter following the *Australian Curriculum* terminology (ACARA 2015g).

This diversity has implications for the resources available to individual schools and groups of schools in relation to collecting, processing and using education data and evidence. For example, the autonomy, size and remoteness of many Independent schools can affect the resources available to meet government requirements relating to education data and evidence. Remoteness of schools more generally (government or non-government) can also drive differences in schools' resourcing, capacity and capabilities with respect to the technical demands of data collection and administration. These issues are considered further in chapter 4.

Objectives of school education

All Australian governments have agreed that Australia's education system should provide high-quality, equitable school education for all Australian children and young people, with the aim of equipping them for effective social and economic participation, and promoting their quality of life. Governments have committed to a set of objectives that seek to improve education participation, attainment and achievement for all children and young people. They also seek to reduce disparities in outcomes between groups (for example, between Indigenous and non-Indigenous children and young people) (boxes 1.1 and 1.2).

1.2 What the Commission has been asked to do

The Australian Government has asked the Commission to investigate the development of a national education evidence base. The Commission's task has been to consider the case for, and specific nature of, a national evidence base for ECEC and school education, for use in informing policy development and improving education outcomes.

In accordance with the terms of reference, the Commission has evaluated and made recommendations on:

- the information required to provide a comprehensive evidence base to inform policy development in early learning and school education. This includes consideration of current data holdings at a national, state and sectoral level, and their effectiveness in supporting education outcomes
- new information that would add value to the evidence base, such as non-cognitive skills and information on employment, health, social services, early childhood and higher education
- addressing barriers to the sharing of education (and other relevant) data
- factors that inhibit access to and use of data to support analysis and evidence-based policy development
- the role that technology and mobile devices can play in influencing the scope, quality and timeliness of data collection and reporting

-
- the costs and benefits of options for improvements to the national education evidence base, including the administrative and financial impacts on schools and ECEC providers, and opportunities for efficiencies in data collection
 - how Australian and overseas governments have approached the use of evidence and sharing of data to improve outcomes (in education and non-education sectors) and the potential benefits and challenges of adopting these practices in the Australian education context.

1.3 Scope of the inquiry

This inquiry encompasses data and evidence relating to education outcomes for children and young people from birth to the end of secondary schooling (typically, age 18 years). (Key terms used in this report are set out in box 1.6.) The issues paper sought confirmation of the appropriate scope of this inquiry in relation to outcomes for children aged under four years, as well as factors outside the education system that impact upon education outcomes. Inquiry participants supported both of these as being in scope, emphasising the crucial influence of early learning on children’s outcomes in later life, as well as the relevance of factors outside the education system, such as health and socioeconomic background. The Commission’s discussion of the education evidence base includes both of these aspects.

For the purposes of this report, consideration of the evidence base does not extend beyond the end of secondary schooling. Several submissions noted the relevance of school-related evidence to student destination, but the terms of reference limit this inquiry to consideration of the evidence base for early childhood and school education. However, the framework set out in this report for guiding the further development of the education evidence base is based on a general set of principles, and so could potentially be extended to post-school education.

The focus of this inquiry is on developing an evidence-based policy capability and embedding evidence-based decision making in education policies and in school and classroom practices. However, it is important to note that the Commission is not reviewing the education evidence base itself. Judgments or analyses about ‘what works best’, for whom and in which circumstances, in education practice are beyond the scope of this inquiry.

Box 1.6 Report terminology

In this report:

- ‘**child**’ or ‘**children**’ are generally used in the context of participation in early childhood education and care
- ‘**student**’ or ‘**students**’ are generally used in the context of school education
- ‘**children and young people**’ or ‘**young Australians**’ are used as umbrella terms to refer to all individuals aged 0–18 years, when referring to early childhood and school education together.

Further:

- ‘**objectives**’ refers to the goals (or *desired* outcomes) that an education policy, framework or program seeks to achieve
- ‘**outcomes**’ refers to what is achieved in practice, against the stated objectives. (In instances where official documents have used ‘outcomes’ to denote policy goals, this report will refer to such goals as ‘objectives’)
- ‘**influences**’ refers to the range of factors that affect education outcomes
- ‘**measures**’ refers to specific, observable indicators of outcomes or of influences.

For example, a national *objective* for school education might be that all young people are literate and numerate. The relevant *outcome* in this case would be the actual literacy and numeracy levels achieved by a given population group, sub-population group, school or individual student. *Influences* on this outcome (at an individual student level) could include the student’s attendance at school and the quality of the student’s home learning environment. *Measures* of these influences could be the student’s number of school absences in the past year, and the number of books in the student’s home, respectively.

1.4 The Commission’s approach

The overarching goal of this inquiry is to identify ways to strengthen Australia’s capacity for using evidence to improve education outcomes.

As discussed in this chapter, all Australian governments have developed and endorsed shared policy objectives for ECEC and school education, and have implemented a range of initiatives aimed at achieving these objectives. However, there has been a growing recognition that these initiatives, and increases in overall funding, have not manifested substantial gains in education outcomes in recent years. This has prompted increased interest in the further development and use of an evidence-based approach to improving outcomes. Yet, without an overarching framework to guide this further development, there is a risk that efforts to strengthen the national evidence base capability may not meet the needs of decision makers in the most cost-effective manner.

To address this policy challenge, the Commission has sought to:

- examine the nature and role of an effective education evidence base, including how data are used to generate evidence, how evidence is translated and communicated in an accessible way to decision makers, and how it is applied to improve outcomes across the education system
- consider existing education data and evidence, and identify gaps in the evidence base
- identify impediments to furthering the evidence base, and consider ways to overcome these impediments
- assess relevant costs and benefits associated with any suggested changes in the collection and administration of education data, and the generation and use of education evidence
- identify priority areas for reform, and institutional and governance arrangements best suited to advance an evidence-based capability.

In doing so, the Commission has adopted an analytical framework based on a set of key principles for guiding further development of the evidence base. This framework has been used to identify and analyse a range of issues, including:

- gaps in existing data collections, including issues relating to the quality or characteristics of the data
- barriers or impediments to accessing and using existing data to generate useful evidence
- barriers or impediments to effective application of evidence by decision makers.

Following identification of these gaps, barriers and impediments, the framework is used to assess options for improving Australia's education evidence base capability. These options are focused on:

- limiting the administrative burden of data collection, processing and management
- harnessing efficiency gains, including through the use of technology
- maximising the usefulness and impact of existing data and evidence, by addressing barriers to access, sharing and linkage
- gaining the most value from rigorous evaluation and assessment of 'what works best' in schools and ECEC services. This could be achieved by translating data into meaningful, relevant and robust evidence and using this evidence to inform practices — ranging from teacher training to classroom instructional methods
- the policy, institutional and governance settings, as well as cultural environments, that will enable effective implementation. This includes processes for supporting implementation of evidence-based practices, including through partnerships between schools, teachers, families and researchers.

The Commission's analysis takes into consideration a range of evidence from Australia and overseas. This includes the analysis and findings of previous reviews and research, international experiences and practices, and information and views from a broad range of stakeholders.

1.5 Conduct of the inquiry

Following receipt of the inquiry terms of reference in March 2016, the release of an issues paper in April 2016 and a draft inquiry report in September 2016, the Commission has engaged widely with stakeholders through meetings and public submissions (appendix A). The Commission received 80 submissions prior to the release of the draft report, and a further 68 submissions after its release. In addition, a roundtable was held in Melbourne, and public hearings were conducted in Melbourne and Sydney.

Inquiry participants have represented the diverse makeup of Australia's education system, and have included Australian, state and territory and local governments, independent authorities, academics and research organisations, and peak industry organisations for schools and ECEC services.

1.6 A guide to the report

The remainder of this report is organised as follows.

- Chapter 2 sets out a framework for guiding the further development of the national education evidence base.
- Chapter 3 provides an overview of the current education data and evidence and assesses the gaps in the evidence base.
- Chapter 4 considers issues associated with data collection, processing and reporting.
- Chapters 5 and 6 focus on issues associated with managing data access and linkage, while meeting privacy and other legislative requirements.
- Chapter 7 addresses the challenges of creating and using evidence, with a focus on improving research and analytical capability and capacity to translate, communicate and implement evidence to improve education outcomes.
- Chapter 8 assesses the institutional and governance arrangements needed for an effective education evidence base capability.
- Appendix A provides details of public consultation undertaken for this inquiry.
- Appendix B gives further detail about data quality issues, data gaps, gaps in evidence and its creation and use, as identified by inquiry participants.
- Appendix C takes stock of the main education data collections and evidence, and measures of external influences.

2 A framework for furthering evidence-based policy

Key points

- An effective education evidence base supports decision makers at all levels of the education system (including national, jurisdictional, school, early childhood education and care (ECEC) service, teacher, and family and community) to make informed choices about programs, policies and practices.
 - It promotes transparency and accountability by those responsible for policy formulation and practice in schools and ECEC services.
 - It assists policy makers and providers to understand what works best in ECEC and school education, and how to apply this evidence in schools and ECEC services.
- A national education evidence base is broader than a single national data repository. It should be a broad system of information that is flexible to meet the needs of decision makers at all levels (tiers) of the education system.
 - A central data warehouse or national data repository will not best meet all needs.
- A national education evidence base requires two key capabilities.
 - A ‘top-down’ capability, for monitoring, benchmarking and assessing the performance of the education system in achieving the stated objectives, promoting transparency and accountability and informing resource allocation.
 - A ‘bottom-up’ capability uses data to evaluate effectiveness of education policies, programs and teaching practices. This enables systematic identification, evaluation and implementation of ways to improve outcomes in schools and ECEC services.
 - The top-down and bottom-up capabilities are complementary; each on its own is insufficient to drive improvements in education outcomes.
- An education evidence-based capability should support a cycle of improvement in outcomes (with respect to Australia’s education objectives), consisting of four processes:
 - monitoring (tracking progress against objectives)
 - evaluation (assessing efficacy and value for money of policies, programs and practices)
 - translation and communication (sharing evidence in a form that decision makers can use)
 - implementation (decision makers using evidence to inform their decisions about policies, programs and practices).
- The evidence base should provide decision makers with data and evidence that are of high quality for their needs (fit for purpose).
- Data and evidence should generate net benefits (benefits in excess of the costs incurred in collecting and processing data, and creating, sharing and using evidence).

Outlined in this chapter is a framework to assess the requirements for a national education evidence-based capability. Set out are the roles and features of an effective education evidence base and the processes by which data and evidence can most effectively be used to support the policy objectives of governments regarding the education system.

2.1 What is a national education evidence base?

In any policy area, relevant, accessible, high-quality evidence is vital for enabling decision makers at all levels of a system to take effective action to support their objectives (ABS 2010; Banks 2009). In education, an effective evidence base supports the monitoring of progress against education objectives, the identification and diagnosis of problem areas, and the development of ways to improve ECEC and school education outcomes. It is also essential for promoting transparency and accountability by those responsible for policy formulation and its implementation in schools and ECEC services.

An effective national education evidence base is more than a simple accumulation of data in a single collection or data ‘warehouse’. As highlighted in chapter 1, the education sector is diverse and the need for evidence occurs at many levels. Data and evidence are used by decision makers across the education system, including:

- children and young people and their families
- schools and ECEC providers, and their teachers and other staff
- teacher educators
- governments at all levels — Australian, state and territory, and local
- the wider community.

Consequently, a ‘big data’ holding or national data repository will not best meet all needs. Further, relevant data for an education evidence base are not restricted to the education system itself, and data linkage across sectors is expected to become increasingly important. For example, maternal and child health records could potentially be relevant to education outcomes and could be linked with education data.

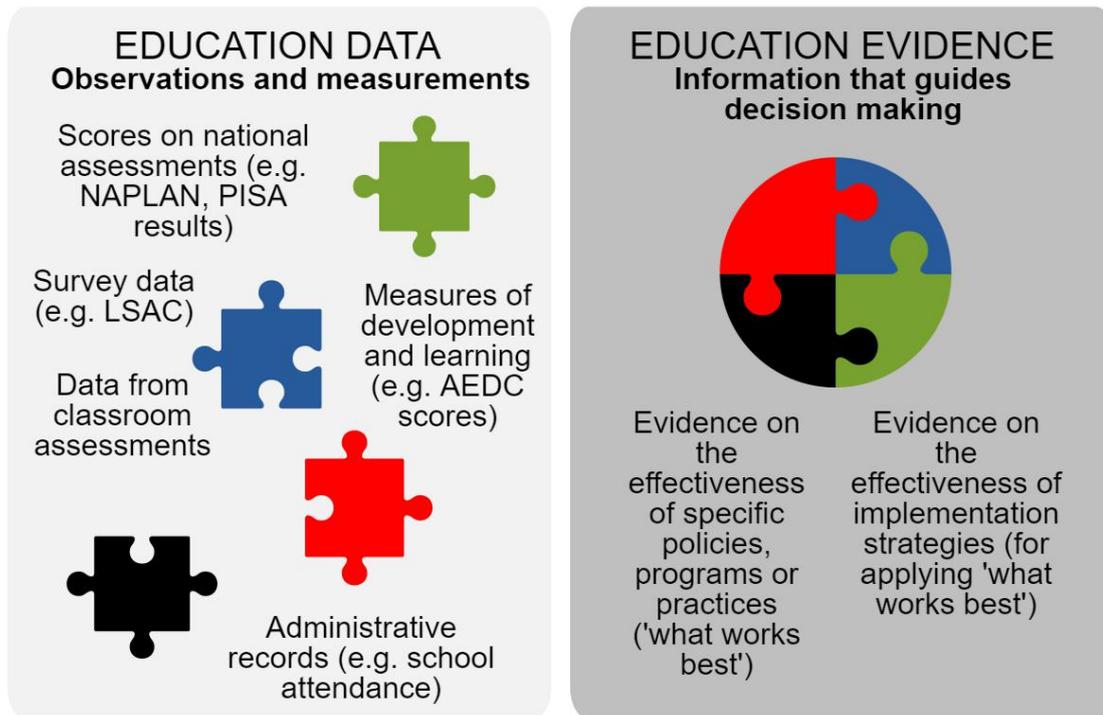
Distinguishing data and evidence

Education data and education evidence are distinct but related concepts (figure 2.1).

Data are measurements or observations about a person or entity (such as an education setting), collected as a source of information (ABS 2013). Accordingly, **education data** are measurements or observations that are collected to provide information about education outcomes and the factors influencing these outcomes. Education data, collectively, include all data holdings that have been collected within, and in relation to, the education system, including ECEC and school education. Although education data can include measures of

education inputs (resources used) and outputs (services delivered) in ECEC and school education, data on outcomes (children’s and young people’s progress against stated objectives) give the best indication about the performance of the education system.

Figure 2.1 **Distinguishing between data and evidence**



Education data can come from diverse sources, ranging from larger-scale processes such as surveys and standardised tests to school-based assessments and administrative systems. Two key sources of data are:

- **research datasets**, which are readily accessible for researchers to use in answering specific research questions
- **administrative records**, which are mainly collected for administrative purposes and require further processing in order to be usable for research purposes (ABS 2013).

Data may take the form of:

- **census data**, which are collected for everyone or everything in a population of interest
- **sample data**, which are collected for a representative sample of a population of interest (ABS 2013).

Data may be prepared and presented in a range of forms. These may include reports on:

- individual progress against education objectives, such as in school reports to families or preschool transition reports
- the quality of programs provided by ECEC services, through the Australian Children’s Education and Care Quality Authority’s *National Quality Standard* rating system (ACECQA 2013c)
- the performance of the broader education sector, such as in the *Report on Government Services* (SCRGSP 2016a).

Relevant, high-quality data are a fundamental building block in the creation of evidence. However, data are a means to an end and not an end in itself.

Education evidence is generated when education data are turned into useful information through rigorous analysis, which can then be used to inform decision making. Crucially, evidence is information that provides guidance — for policy makers, schools, ECEC providers, teachers, families and students themselves — on best practice, or ‘what to do and how to do it’. In contrast, education data provide indicators that are helpful for diagnosing areas of weakness, as a first step in identifying scope for improvement. Data are also important for benchmarking, reporting and accountability purposes. The difference is that data alone do not offer guidance about how to improve outcomes (‘what works best’).

Two key forms of education evidence are:

- information about the impact and effectiveness of specific programs or teaching practices (‘what works best’)
- information about the impact and effectiveness of specific implementation strategies for translating research into practice (such as teacher professional development programs).

A key theme of this report, and one endorsed by many inquiry participants, is that data only have value for informing decisions if they can be and are transformed into meaningful information that can be used to inform decision making. For example, Speech Pathology Australia (sub. 35, p. 12) submitted that:

The drawing together of relevant data items on its own will not lead directly to improved policy and planning an[d] outcomes for students – it is merely pre-requisite for this to occur. ... For data to be an ‘evidence base’ it requires both drawing together of relevant data *AND* the use/promotion of this data in everyday practice by end users.

Similarly, the STEM Education Research Centre (sub. DR123, p. 2) emphasised putting evidence into practice:

... the purpose of accumulating this evidence should be to identify what works for individual students and groups of students in particular contexts, and on informing iterative cycles of education design and implementation.

The focus of this inquiry is on the education evidence base, including approaches to enabling evidence-based decision making in education policies, programs and practices. However, as noted in chapter 1, the Commission is not reviewing the education evidence base itself or making judgments about effective practices.

A framework for further developing a national education evidence base

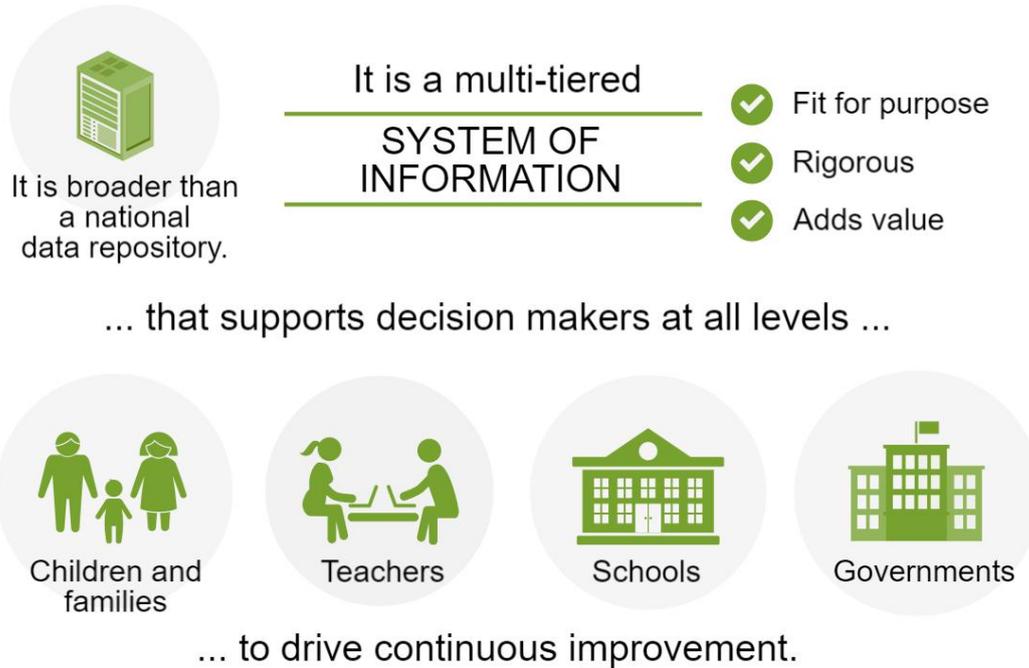
Outlined in figure 2.2 is a framework for assessing the requirements for an education evidence-based capability, based on a set of key principles (box 2.1) and encompassing both top-down and bottom-up approaches.

Throughout this report, the framework described in this chapter is used to guide the assessment of the design and elements of a national education evidence base. The overarching themes discussed in this chapter are: the importance of evidence-based decision making in education, the need for a tiered system of information that meets the diverse needs of decision makers, and the vital role of bottom-up evaluation of effectiveness in education practices. These underpin the perspective taken on the many and varied range of issues relevant to the national education evidence base.

The framework guides the identification and analysis of current issues, including:

- gaps in existing data collections, including issues relating to the quality or characteristics of the data (chapter 3)
- barriers or impediments to accessing and using existing data to generate and fill gaps in the evidence (chapters 4, 5 and 6)
- barriers or impediments to the translation, communication and effective use of evidence by schools, educators and families (chapter 7).

Figure 2.2 What is an effective education evidence base?



Box 2.1 Key principles for guiding the further development of a national education evidence base

The education evidence base refers collectively to the education evidence available to inform decision making by all those involved in the education system, and the underlying data used to generate this evidence.

Principle 1

A national evidence base should be a broad system of information that meets the varied needs of decision makers at all levels (tiers) of the education system.

Principle 2

It should provide decision makers with data and evidence of a suitable quality to be useful and reliable in informing judgments.

Principle 3

It should support a cycle of improvement in education outcomes (with respect to stated system objectives), through four interconnected processes:

- monitoring (tracking progress against objectives)
- evaluation (assessing efficacy and value for money of policies, programs and practices)
- translation and communication (communicating evidence in a form that is usable for decision making, such as developing guidelines that can be applied by schools and teachers)
- implementation (practitioners applying evidence to inform their decisions about policies, programs and practices, and making a difference to outcomes).

Principle 4

It should generate net value (in excess of the costs incurred in collecting and processing data, and creating, sharing and using evidence).

Following identification of these gaps, barriers and impediments, the framework is used as a basis for assessing options for improving Australia’s education evidence base capability. These options are focused on:

- limiting the costs arising from the administrative burden of data collection, processing and management
- harnessing efficiency gains, including through the use of technology
- maximising the usefulness and impact of existing data and evidence, by addressing barriers to access, sharing and linkage
- gaining the most value from rigorous evaluation and assessment of ‘what works best’ in schools and ECEC services. This could be achieved by translating data into meaningful, relevant and robust evidence and using this evidence to inform practices — ranging from teacher training to classroom instructional methods
- the processes, policy, institutional and governance settings and cultural environments needed for these options to be accepted and implemented most effectively.

RECOMMENDATION 2.1

In supporting the further development of a national education evidence base, governments should be guided by the following principles.

The national education evidence base should:

- meet the varied needs of decision makers at all levels of the education system
- provide high-quality data and evidence to inform decisions
- drive improved student achievement through four interconnected processes — monitoring of performance, evaluation of what works best, translation and communication of evidence, and practical application of that evidence by educators and policy makers
- generate benefits in excess of the costs incurred in collecting and processing data and in creating, sharing and using evidence.

2.2 A top-down approach: monitoring, benchmarking and accountability

There are two complementary and distinct approaches that should be used to support Australia's progress towards national education objectives (set out in chapter 1):

- a 'top-down' approach, based on monitoring and benchmarking the performance of ECEC and school education in achieving stated policy objectives. The top-down approach is primarily aimed at supporting transparency and accountability, but it can also be used to identify areas of weakness. It can occur at a national or jurisdictional level (for example, the *My School* website and statewide *Australian Early Development Census* results respectively) as well as at sub-jurisdictional levels (such as at an individual school or classroom level)
- a 'bottom-up' approach, based on evaluation of ways to improve education outcomes. By nature, this tends to focus on the school and classroom level, and on creating and applying evidence to inform education policy and practice used in schools and ECEC services.

The top-down approach has a focus on education data, and using these data as a means of reporting how an individual, group or population is faring against stated education objectives. It can enable decision makers, including schools, teachers, families and students themselves, to identify problem areas that require further work. By contrast, the bottom-up approach has a focus on education evidence, and applying evidence about 'what works best' (and what does not) to change policies and practices.

The need for both approaches has been recognised by Australian governments:

All governments recognise that the collection, provision and publication of data on student outcomes and school performance is essential for public accountability. (COAG 2009b, p. 8)

It is generally recognised that student and school performance as measured by external tests can provide consistent approaches to analysing student outcomes. ... [At the same time, r]ecent reforms in Australia appear to herald a transition toward a more holistic approach to school performance and improvement. ... Australian jurisdictions have begun examining the characteristics of schools which are performing well and demonstrating continuous improvement, within a range of contexts. (DEEWR 2010, pp. 5–6)

The purpose of top-down monitoring and benchmarking is to use data to track outcomes systematically with respect to stated objectives, and to inform all stakeholders about the extent of progress, achievement and the use of resources within the education system (Fakharzadeh 2016). This approach has been used in Australia and other developed countries with the aim of driving improved outcomes through increased transparency, accountability, and competition. It has been the impetus behind key education reforms over the past decade:

Competition between schools combined with test-based accountability on predetermined knowledge standards has become a common approach. ... National reforms — particularly the *Smarter Schools National Partnerships* and *National Curriculum, National Assessment Program for Literacy and Numeracy* and *MySchool* — are driving a stronger emphasis on outcomes, targets, accountability and transparency in reporting, reflected in reforms across the developed world. (DEEWR 2010, p. 3)

Monitoring and benchmarking promote transparency and accountability in relation to how the education system has performed in light of the resources invested in it, and guide resource allocation. Monitoring is an essential first stage in an evidence-based approach to improving education outcomes. Without good measures of progress towards stated objectives — and benchmarks against which to interpret this progress — it is not possible to robustly assess the efficacy and cost-effectiveness of policy interventions or school programs. That is, monitoring complements, and is a precursor to, effective evaluation (discussed in section 2.3).

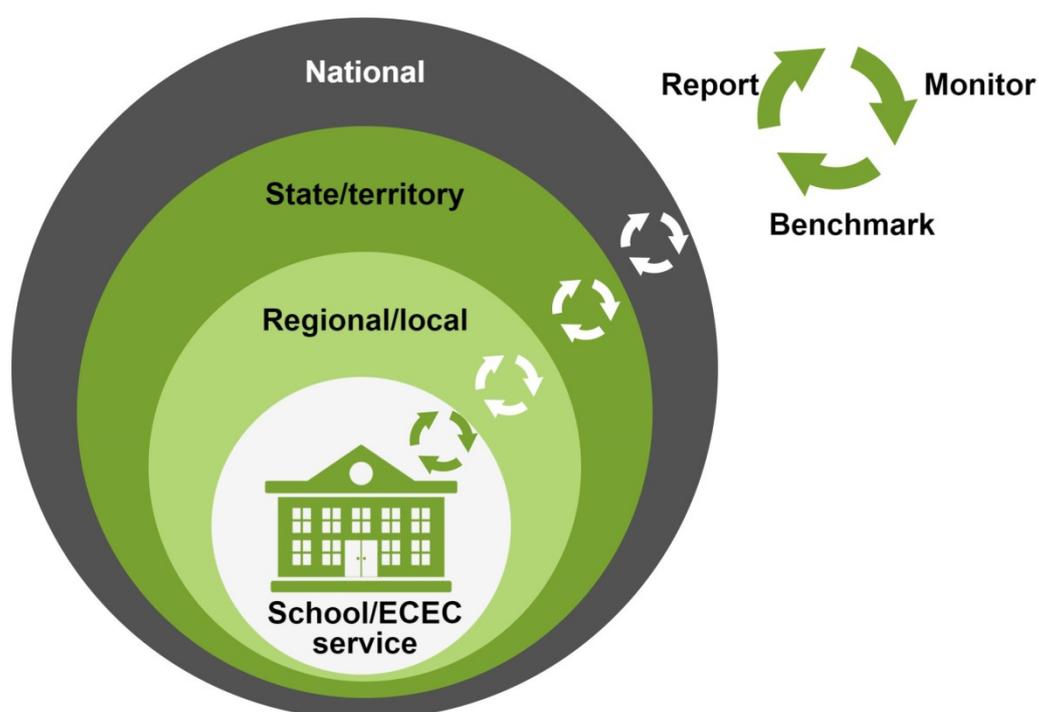
Monitoring and benchmarking emphasise the use of national-level data, such as data from a census or a sample of a given national-level population. Such data collections have the advantage of ensuring that monitoring is done on a nationally consistent basis, enabling comparative performance assessment across schools, jurisdictions and sub-population groups. National-level data collections can also be used to follow children and young people across ECEC services and schools, including between different service types (such as movements between government and non-government schools).²

² Options for tracking children and young people across different parts of the education system, such as the use of unique student identifiers, are canvassed in subsequent chapters.

National-level data can be used in a ‘tiered’ manner by decision makers at different levels of the education system. Data collected through national surveys or assessments can be used to identify problems and inform planning and decision making at a jurisdictional, regional, school or ECEC service level. For example, teachers can use *National Assessment Program — Literacy and Numeracy* (NAPLAN) data to identify specific areas of weakness in literacy and numeracy skills among students in their class, and use this as a starting point for locating strategies or programs that could help students to improve in these areas (Dooner 2011).

At every level, decision makers use relevant data to track progress, assess and interpret measured outcomes against appropriate benchmarks, and report progress to stakeholders. This cycle of monitoring, benchmarking and accountability is depicted in figure 2.3.

Figure 2.3 **Monitoring at each level of the education system**



Source: Adapted and modified from Grattan Institute (sub. 61).

Data and information requirements for a top-down approach

Effective monitoring and performance benchmarking requires data and information on:

- a broad range of education outcomes
- appropriate benchmarks to interpret measured outcomes

-
- factors influencing education outcomes
 - outcomes at different levels of the education system
 - how outcomes have changed over time.

Each of these is discussed in turn below.

A broad range of education outcomes

In ECEC and school education, Australia has national education objectives that relate to cognitive as well as non-cognitive skills and attributes (chapter 1). A national education evidence base therefore should be able to provide data and information on young Australians' progress across all developmental and learning domains (cognitive and non-cognitive) rather than only in traditional academic areas.

Collecting data on cognitive outcomes is relatively straightforward. The challenge lies with data on non-cognitive outcomes, which by their nature do not readily lend themselves to measurement. Non-cognitive education outcomes include capabilities and attributes such as collaboration, persistence and self-control. They may also include aspects of social and emotional health and wellbeing.

However, to be incorporated into an evidence base, these non-cognitive outcomes must be translated into specific measures. This will generally require additional work in defining the desired skills and knowledge and how these may be observed and assessed in practice. Gaps in data and evidence relating to non-cognitive outcomes are discussed further in chapter 3.

Benchmarking measures of success

The evidence base should provide both absolute and relative measures of young Australians' progress. This means collecting data about education outcomes with respect to national standards, as well as information on the gains made by individual children and young people over time.

Measuring outcomes with respect to common standards gives decision makers a consistent reference point for interpretation — whether it be families reading their children's school reports, or government departments assessing the performance of schools in their jurisdiction. Reporting against national benchmarks supports assessment of Australia's progress against education objectives, such as national minimum standards for literacy and numeracy (chapter 1).

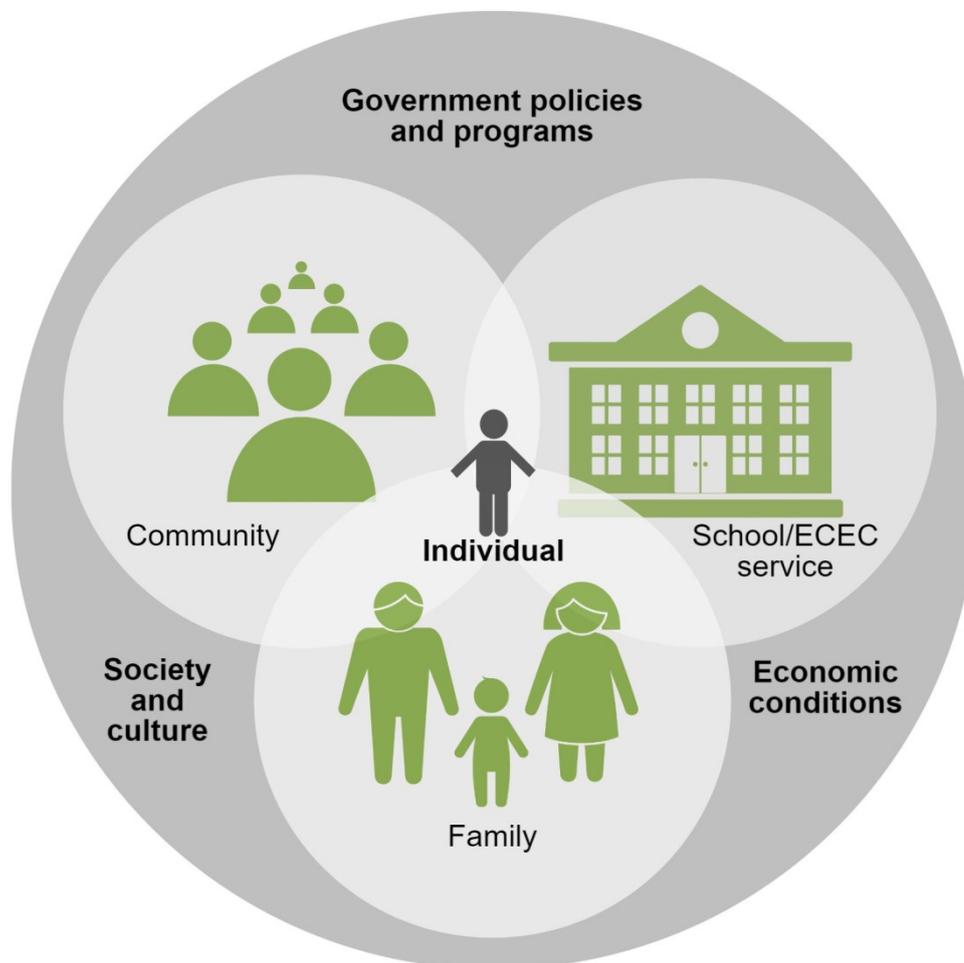
At the same time, incorporating information on individual development and learning progress within a given time period supports the *Melbourne Declaration* aim that education should enable all children and young people to fulfil their individual potential (MCEETYA 2008). For example, in the context of school education, the Grattan Institute

(Goss and Sonnemann 2016; Grattan Institute, sub. 61) has suggested using a ‘years of progress’ measure of achievement, to report on the extent of an individual student’s learning progress from one year to the next.

Influences on education outcomes

The evidence base should provide information on the factors that contribute to young Australians’ education outcomes. Many interrelated factors influence an individual’s development and learning (figure 2.4).

Figure 2.4 **Many interrelated factors influence education outcomes**



Source: Adapted from ARACY (2008).

These factors can be grouped into two categories.

- *Within-system influences* are factors within the education system, such as policy settings, curricula, education programs and teaching practices.
- *External influences* affect education outcomes but are not directly manageable by the education system; for example, individuals' gender, health, Indigenous status, parents' education attainment, remoteness, and disability.

The distinction of influences based on what factors can be altered by policy interventions is not always clear-cut. Some external influences can be indirectly mediated by practices, policies and programs within education institutions. For example, the way in which teachers and schools communicate with families can affect the quality of parents' engagement in their children's learning (APC, sub. DR133; Emerson et al. 2012). (Parent engagement is discussed further in chapter 3.)

Information on within-system and external influences is necessary for contextualising the results of monitoring and benchmarking, so that outcomes can be interpreted meaningfully. For example, the *My School* website provides contextual information, such as schools' geographic location, enrolment size and students' socioeconomic background, to aid in interpretation and comparison of reported measures of school performance (ACARA 2016g).

Data and evidence from sources outside education, such as the health sector, can be useful in understanding the impact of external influences. For example, information on family and socioeconomic background could be gathered from non-education data, such as from the income support or justice systems. Gaps in data and evidence relating to influences on education outcomes are discussed further in chapter 3 and impediments to accessing and using existing data collections (including issues relating to data linkage capabilities) are discussed in chapters 5 and 6.

Data and information at different levels

Given Australia's education objectives and shared responsibilities for education policy (chapter 1), data and information are needed on education outcomes at different levels, from individual outcomes to system-wide performance. This enables assessment of the extent to which national education objectives are being achieved in relation to young Australians overall as well as for sub-population groups (such as Indigenous children and young people with learning difficulties). It also supports the diverse needs of decision makers throughout the education system. Families, schools, ECEC services, local and jurisdictional governments variously require information about education outcomes (and the influences on these outcomes) at multiple levels (individual, class, school or regional).

Data and information about changes over time

The evidence base should include information about changes over time in the outcomes of individuals, groups and system-wide performance, in order to gauge the extent of progress (or otherwise) towards education objectives. Information about changes in outcomes and influences over time is also essential for evaluation (section 2.3). An illustration of the way in which outcomes might be measured at different levels and over time is given in box 2.2.

Box 2.2 **Measuring outcomes at different levels and over time: an illustration**

Information on young Australians' development of language, literacy and numeracy skills can be used to assess progress against national education objectives relating to these areas of learning. For example:

- the early childhood education and care objective that 'children are effective communicators' (DEEWR 2009, p. 38) might be measured using national average scores on the 'communication skills and general knowledge' component of the *Australian Early Development Census* (AEDC) (DET 2015b)
- the school education objective that children and young people are 'meeting basic literacy and numeracy standards' (COAG 2009b, p. 5) might be measured using national average *National Assessment Program — Literacy and Numeracy* (NAPLAN) scores.

These AEDC and NAPLAN scores can meet the diverse needs of decision makers by providing information at **different levels**.

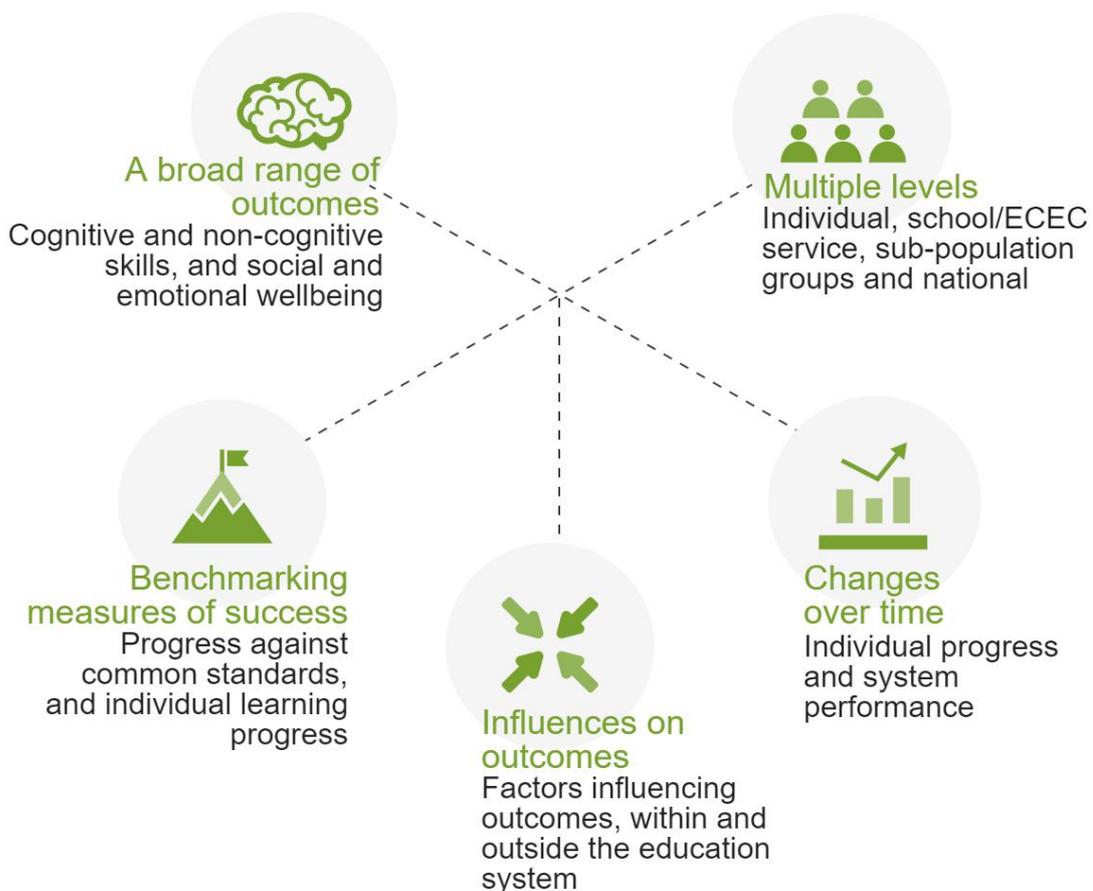
- Individual NAPLAN scores and average scores for a class of students are likely to be of most relevance to classroom teachers, to assist them in making decisions about how to support the literacy and numeracy skills of students in their class. (Note that the AEDC is not designed to be a diagnostic tool or a measure of individual children's strengths, but rather a community-level indicator of developmental vulnerability. The fitness for purpose and quality characteristics of data are discussed further in section 2.5.)
- School-wide average scores would be most relevant to school leaders, to assist them in making decisions about literacy curricula, teaching practices and resource allocation.
- National average scores, and average scores for sub-population groups (such as students from low socioeconomic backgrounds) would be most relevant for national, state and territory government departments and agencies, for monitoring and benchmarking system-wide performance in meeting literacy and numeracy objectives.

Decision makers also need information about individual and group outcomes **over time**, to understand individual progress as well as how a system has 'added value'. For example:

- by comparing a student's Year 3 and Year 5 NAPLAN scores, school leaders can assess how well the school has been supporting that student in between these assessments
- by comparing the local community's average AEDC scores over time, local governments can assess how well the community is supporting young children's development
- by examining changes in jurisdictional and national average NAPLAN scores, state and territory governments can assess the absolute and relative performance of their education systems over time.

The above data and information requirements are summarised in figure 2.5. This figure highlights that although national-level data may play a key role in top-down monitoring, benchmarking and accountability processes, a national education evidence base is broader than a single repository of data and should meet the needs of all decision makers. Data and evidence must be able to track and support educators and other decision makers to interpret progress and report on outcomes in a way that is relevant and meaningful.

Figure 2.5 **Data and information requirements to support monitoring, benchmarking and accountability**



2.3 A bottom-up approach: evaluation of ‘what works best’ in policy and practice

Top-down monitoring and performance benchmarking provide information about how children and young people are progressing towards national education objectives. However, there is a growing recognition that a top-down approach, on its own, is insufficient to achieve improved outcomes.

Over the past decade or two, education systems in Australia and in many other developed nations have placed an increasing emphasis on monitoring and accountability, through national standardised assessments and public reporting of assessment results. However, the assumption that doing so will, of itself, drive improvements in outcomes (through accountability, transparency and competition) has been challenged in Australia and overseas (Barber and Mourshed 2007; Goss and Hunter 2015; OECD 2013c).

Empirical evidence as to the success of this focus on accountability, within frameworks or generally on improving student outcomes, is contested. For example, significant reforms to public education in England since 1988 have included an emphasis on national curriculum, local management of schools, greater choice and diversity among schools ... However, there has been slippage in England's international rankings and the gap between high and low-performing schools and school systems remains of deep concern. (DEEWR 2010, p. 5)

The pressures of transparency and public accountability can result in adverse incentives and unintended consequences, unless accompanied by evidence on effective teaching practices and interventions, and the capacity and capabilities required to implement effective practices (Barber and Mourshed 2007; OECD 2013c).

Crucially, most of the variation in student outcomes, in countries such as Australia, is attributable to variation between individual students ('within-school' rather than 'between-school' variation) (Masters 2016). Evidence points to teacher quality as the key driver of this student-level variation in outcomes (Barber and Mourshed 2007). In view of this, policy makers are increasingly turning to a closer examination of the role of evaluation in identifying and implementing 'what works best', for whom and in which circumstances, to improve outcomes and achieve learning objectives at the classroom level (OECD 2013c). Although these studies focus on factors within the realm of school and classroom practices, there is also a growing recognition of the importance of the relationships between schools, teachers and families, particularly with respect to the impact of parent engagement in their child's learning (Emerson et al. 2012) (discussed further in chapter 3).

For these reasons, a top-down monitoring and benchmarking approach needs to be complemented by a bottom-up approach, which seeks to evaluate the impact and cost-effectiveness of specific programs, policies and practices at a jurisdictional, school or classroom level (Fakharzadeh 2016). Evaluation generates evidence about 'what works, for whom, and in what circumstances' (Mitchell Institute, sub. 31, p. 5) in education policy, programs and practices. This evidence can relate to decisions made by policy makers, by school or ECEC leaders and administrators, by individual teachers, or by families. It can also pertain to the relationships between these decision makers. Evidence may relate to broad populations of learners (such as effective curricula and pedagogies for primary school mathematics) or to specific groups (such as effective strategies for teaching students from culturally and linguistically diverse backgrounds).

FINDING 2.1

National level data play a key role in top-down monitoring, benchmarking and accountability processes, but alone are insufficient to achieve improved outcomes. They need to be complemented by a bottom-up approach that generates, translates and communicates evidence about:

- what works best, for whom and in what circumstances
- the most effective strategies for implementing best practice in schools and early childhood education and care services.

A four-step approach to effective evaluation

Effective evaluation requires a rigorous, systematic approach, with strategic policy direction and collaboration between researchers, schools, ECEC services, teachers and families. This approach has four key elements (figure 2.6):

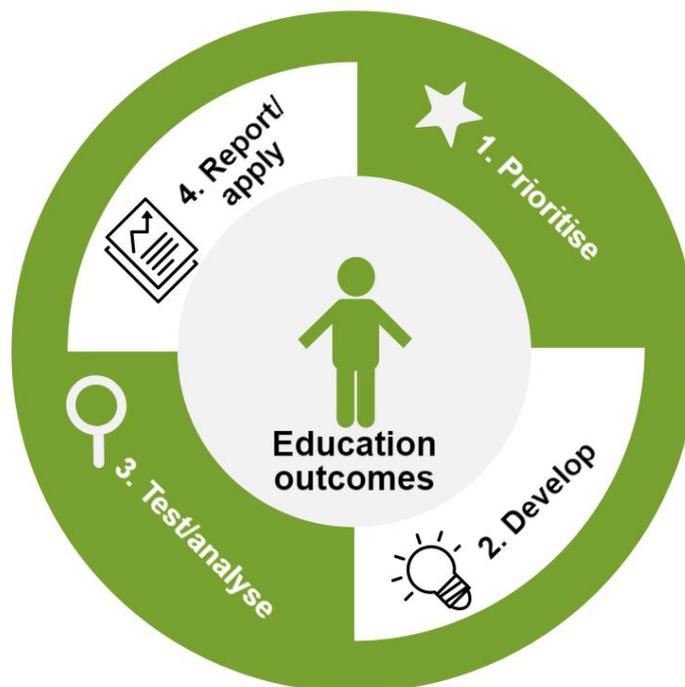
- prioritising areas for research
- developing potential interventions for evaluation
- assessing these interventions using rigorous methods
- reporting, translating, communicating and applying research findings.

Prioritising areas for research

First, evaluation requires a strategic approach to identifying and selecting priority areas of teaching and learning that warrant investigation. Many inquiry participants emphasised that education research (which includes, but also goes beyond, evaluation) should be driven by the needs and purposes of the Australian education system (for example, Mitchell Institute, sub. 31; MCRI, sub. 47; RIPPLE, sub. 45; SVA, sub. 59; United Voice, sub. 42).

Under a strategic approach, policy makers set explicit priorities for research in accordance with identified gaps in the evidence base. This does not necessarily imply a uniform set of national research priorities, as priorities and circumstances are likely to vary across jurisdictions (NSW Government, sub. DR145; Queensland Government, sub. DR142). (Some evidence gaps are discussed in chapter 3, and strategic approaches to guiding education research are considered in chapter 7.)

Figure 2.6 A four-step approach to effective evaluation



Source: Adapted and modified from Grattan Institute (sub. 61).

Jurisdiction-based research strategies can help ensure that research is relevant to local needs, in turn making it more likely to be implemented in practice (SVA, sub. DR98). A nationally coordinated set of research priorities would take into account jurisdictional differences, as priorities would be developed through co-operation and collaboration between all Australian governments. Setting research priorities, and institutional arrangements to support a national research strategy, are discussed further in chapters 7 and 8 respectively.

Developing potential interventions for evaluation

Second, within identified research priority areas, there should be a process to identify and/or develop promising policies, practices and interventions. These can include teaching practices, programs or approaches to teaching particular knowledge, skills or curriculum areas. They could also be more general practices, such as approaches to assessment or ways to engage families. Interventions could be identified from many possible sources, including from:

- looking ‘under the hood’ at the practices of high-performing schools and ECEC services. For example, this could involve analysing the practices of schools that have shown sustained improvements in student outcomes, or that have achieved higher than

expected outcomes given the socioeconomic profile of the communities they serve (DEEWR 2010)

- previous academic research and reviews, such as statistical analyses of links between ECEC participation and later school outcomes
- international practices.

Assessing these interventions for impact and cost-effectiveness

Third, interventions should be assessed rigorously, using high-quality evidentiary methods, such as randomised controlled trials and other robust analytical methods. Crucially, whichever method is chosen must be able to identify the *causal* effect of the intervention on learning outcomes, separately from the impacts of other influences. This means that evaluation, like monitoring, also requires data on within-system and external influences on outcomes, such as students' socioeconomic backgrounds. (It may also be desirable to examine the effect of these external influences, in order to assess the need for interventions to be targeted at particular groups requiring additional support.)

Assessment of interventions should pay particular attention to isolating the effect of the selected intervention from any effect associated with the teacher and/or school that is implementing the intervention. This is essential for determining the extent to which an intervention is 'scalable' — whether it works across schools and ECEC services and groups of children and young people (QldDET 2016b), or whether its effectiveness depends on particular school or teacher characteristics. Equally, if assessment uncovers a significant positive or negative 'teacher effect' or 'school effect', it might be worthwhile to investigate this further, in its own right. For example, if certain teacher qualities or attributes were found to significantly mediate the effectiveness of a given classroom practice for learning outcomes, this may have implications for selection into, and/or content of, teacher education programs.

The assessment process should also incorporate analysis of the cost of implementing a given intervention. This, too, has implications for whether an effective program or teaching practice offers the best 'value for money' in terms of improved outcomes (QldDET 2016b), and whether it would be cost-effective to implement the intervention more broadly across schools and ECEC services. This is important for ensuring efficient resource allocation both at a system-wide and school or ECEC service level, particularly given the diverse characteristics and needs of schools and ECEC services (chapter 1).

Reporting, translating and communicating research findings

Finally, evaluation requires that key research findings are translated and communicated in an accessible, usable form to all decision makers, including schools, teachers and families.

Translation and communication of evidence can take a variety of forms, such as:

- the publication of information derived from monitoring, as in the quarterly *National Quality Framework 'Snapshot'* publications, which provide information on the quality ratings of ECEC services (ACECQA 2016b)
- written guidelines, videos, case studies or other exemplars of evidence-informed practice in relation to a particular aspect of school education or ECEC. For example, syntheses and summaries of education research on specific practices and interventions (as provided in the *Teaching and Learning Toolkit* (EEF 2016b)) and video demonstrations of effective classroom practices (as provided by the Australian Institute for Teaching and School Leadership)
- through the networks of schools and ECEC providers. For example, Early Childhood Australia provides its members (ECEC services and staff) with practice guidelines and video resources demonstrating effective practices (ECA 2016b)
- through parent organisations and networks as well as through communication between schools, ECEC services and the families they serve (APC, sub. DR133; ISCA, sub. DR138). As noted by the Independent Schools Council of Australia (sub. DR138), it is vital that research findings are communicated with families in an accessible manner.

Communicating evidence in an accessible manner is an important precursor to translating research into practice. Simply providing information is not enough; the evidence must be applied in order to make a difference to outcomes (section 2.4).

Top-down and bottom-up approaches are complementary

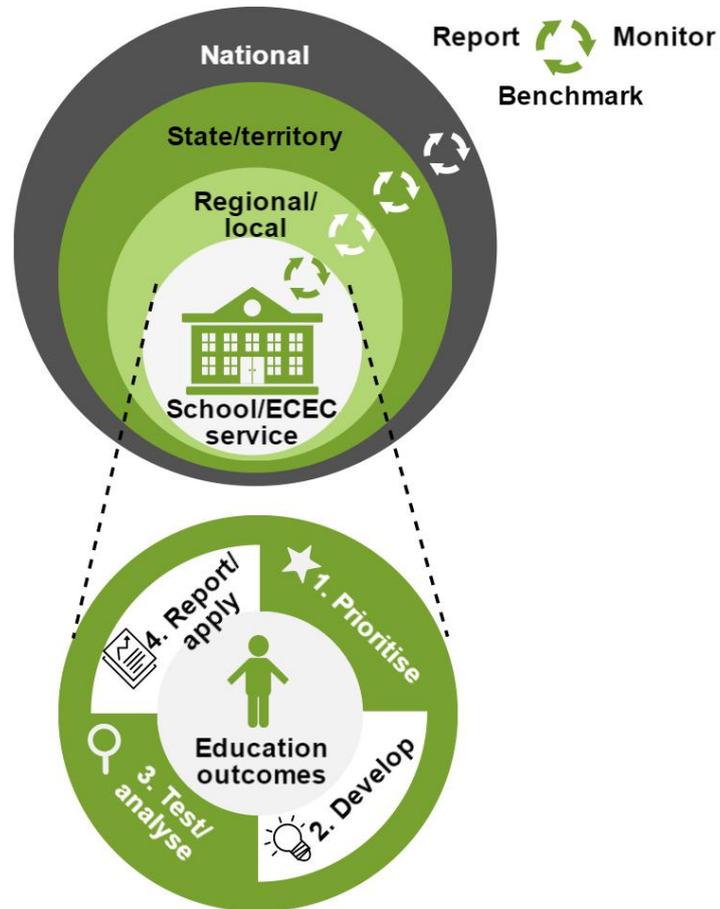
An effective national education evidence base involves complementary and integrated use of top-down and bottom-up approaches (figure 2.7).

Top-down monitoring and performance benchmarking can reveal where weaknesses lie and inform the identification of research priorities. For example, national-level data might indicate a lack of progress in particular outcomes, such as mathematics achievement in secondary schooling or emotional regulation in early childhood. This might reveal a need for additional research into effective teaching practices targeting these specific areas or the evaluation of existing practices. This illustrates the complementary nature of the top-down and bottom-up approaches, where top-down monitoring and benchmarking can provide useful information to guide priorities for bottom-up evaluation.

Conversely, when research findings from bottom-up evaluation are used to inform classroom practices, the combined impact of these actions should be evident in top-down monitoring. For example, after the rollout of evidence-informed classroom practices or school-wide programs, school leaders and teachers could use monitoring to examine overall trends and progress in student outcomes. From national and jurisdictional levels to individual schools and ECEC services, monitoring and evaluation can be used in tandem to

track progress towards education objectives, diagnose problem areas, and identify possible best practices for improving outcomes.

Figure 2.7 **Top-down and bottom-up approaches should work together**



Source: Adapted and modified from Grattan Institute (sub. 61).

2.4 Implementation: applying evidence to make a difference

Crucially, data and evidence can only support improved outcomes as well as transparency and accountability to the extent that they are used to implement best practices in a systematic way across schools, ECEC services and jurisdictions. Even the highest-quality evidence, based on the most rigorous analysis, cannot improve education outcomes if it is not adopted and successfully applied by schools, teachers and ECEC services. As discussed in chapter 7, implementation requires a culture where the people and

organisations who influence education outcomes are able to make decisions that are grounded in evidence.

Effective application of evidence requires teachers' professional judgment. It depends critically upon teachers and school leaders:

- being *aware* of relevant, quality evidence that offers insight in relation to their specific needs
- being able to *analyse* this evidence to form a judgment as to whether the benefits of a program or practice are likely to be applicable to their specific local context and conditions
- being able to *adopt* and *adapt* an evidence-based program or practice successfully in their context, including by implementing any required staff training, and managing barriers to change
- being able to *evaluate* and *adjust* implementation as appropriate
- deciding whether to *embed* or *omit* (discard) the program or practice, based on the evidence of its impact and effectiveness in their specific context (SVA, sub. 59).

Partnerships between researchers, schools and ECEC services could play an important role in assisting teachers and school leaders to develop skills in implementing evidence-based practices. Such partnerships can also enable schools and teachers to 'feed back' information to researchers about the successes and challenges they experience in seeking to implement research findings.

Crucially, effective application requires a culture within education systems that is open and receptive to evidence, and to 'chang[ing] existing practices if evidence supports the need' (ARACY, sub. DR116, p. 4). At the same time, effective and sustainable implementation of research findings is likely to require some adaptation to account for variation in local education contexts (AARE, sub. DR114). As submitted by several inquiry participants (for example, AARE, sub. DR114; ISCA, sub. DR138; NSW Government, sub. DR145; Ladwig, sub. DR137; Queensland Government, sub. DR142), one size does not necessarily fit all, and the importance of taking diverse needs and circumstances into account when applying research findings should not be understated.

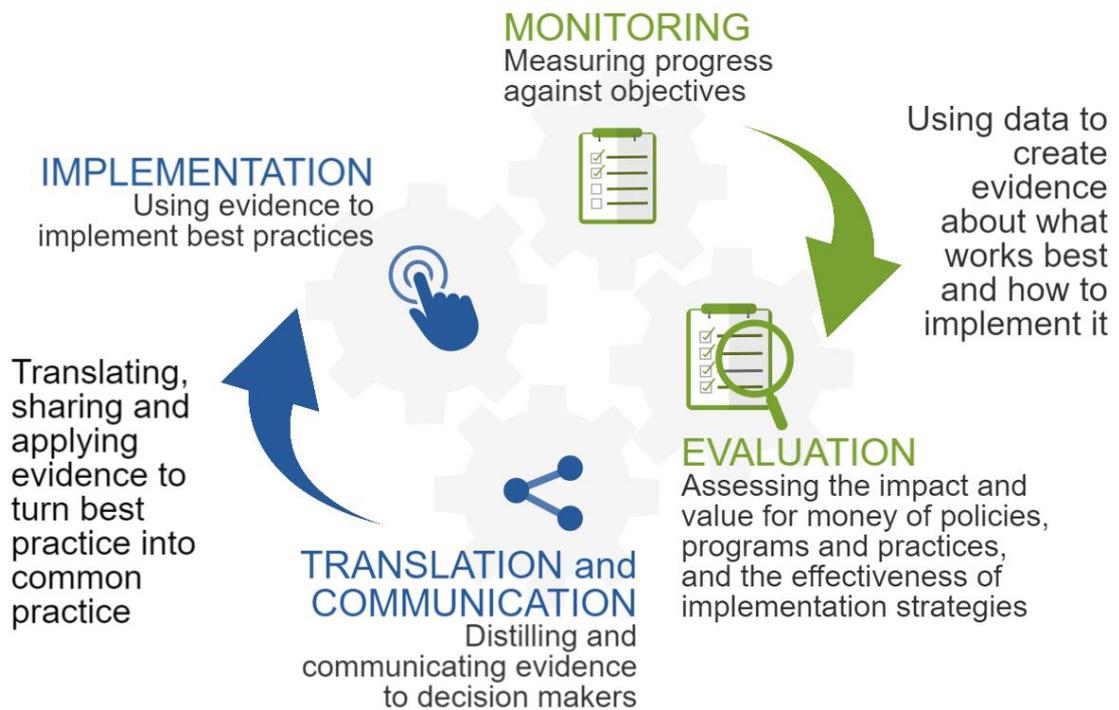
Evaluation should also play a role in identifying the most effective strategies for implementing evidence-informed teaching practices. Where evaluation has identified particular programs or practices as highly effective and value for money, additional work should then be directed at assessing how best to share and apply these research findings at the school or ECEC service level. This might involve, for example, evaluation of the efficacy and cost-effectiveness of:

- specific forms of in-service and pre-service teacher education and professional development programs
- particular formats for communicating research findings to teachers, such as guidelines, toolkits, videos or online tutorials.

That is, evaluation not only aids in understanding what works best to improve education outcomes, but also in identifying what works best to convert this knowledge into classroom practice. (Improving translation, communication and implementation is discussed further in chapter 7.)

Together, monitoring performance and evaluation, translation and implementation of evidence form a ‘cycle of improvement’ in which data and evidence are used to continually assess and inform practice and contribute to improved outcomes (figure 2.8).

Figure 2.8 **A cycle of improvement**



2.5 Quality and fitness for purpose

Under the framework presented in this chapter, an effective education evidence base is underpinned by data that are ‘fit for purpose’ and of sufficient quality to support the generation of robust evidence.

Fit for purpose data

Fitness for purpose essentially means collecting the ‘right’ data — data that are relevant to the needs and purposes of decision makers across the education system.

Decision makers are diverse in their characteristics, with schools and ECEC providers varying greatly in terms of local needs, resources and capabilities (chapter 1). This diversity underscores the importance of having a multi-tiered education evidence base, so as to meet decision makers' varied needs and purposes. It also implies a need for differentiation in the characteristics of education data, depending on who will be using the data, and for what purpose (Mansell, James and Assessment Reform Group 2009). For example, the timeliness and accessibility requirements for data collected to inform decision making at a jurisdictional level are likely to be different from those for data collected to inform day-to-day teaching and program delivery in a school classroom or ECEC service.

Quality of the evidence base

The quality of a national education evidence base depends on the quality of the underlying data, and on the rigour of the methods used to generate evidence from these data.

Data quality

Many of the desirable characteristics of education data identified in the terms of reference for this inquiry, such as comprehensiveness, consistency, accessibility and timeliness, are included in the ABS (2009) *Data Quality Framework* used to assess the quality of a data collection (box 2.3).

Under the *Data Quality Framework* — and reflecting the emphasis on fitness for purpose and on data as a means to an end, rather than an end in itself — the importance of these characteristics must be assessed with respect to the purposes and needs of those using the data to generate evidence. This point is taken up in chapter 3, where gaps in the quality and characteristics of data holdings are assessed from the point of view of the needs of the data users.

Coordination of information across the different components of the education system is also important for enabling decision makers to access relevant information. In particular, an evidence base should be able to coordinate data and evidence across key transitions such as from ECEC to school education, primary to secondary schooling and between the government and non-government sectors. The tracking of students across multiple education providers is discussed further in chapter 4, and issues relating to data access, sharing and linkage are examined in chapters 5 and 6.

Box 2.3 Desirable characteristics of education data

The ABS *Data Quality Framework* presents seven key characteristics that can be used to assess the quality of a data collection. These are the:

- institutional environment — the institutional context in which the data are produced. This includes the objectivity, independence, mandate, resourcing, quality processes and confidentiality procedures of the institution or organisation producing the data
- relevance — the extent to which the data meet user needs in terms of the concept(s) measured and population(s) represented. This includes the scope and coverage of the data, classifications and statistical standards used and whether the dataset incorporates all relevant items of interest
- timeliness — the length of time between the period to which the data pertain and when the data are released, and the frequency of data collection
- accuracy — the extent to which the data correctly describe what they are designed to measure
- coherence — the internal consistency of the data, as well as its comparability with other sources of information. Coherence is promoted by the use of standard concepts, classifications, populations and methods of collection
- interpretability — the availability of information ('metadata') to aid insight and understanding of the data, such as explanation of concepts and classifications used in the data
- accessibility — the ease with which users can obtain the data. This includes whether the data are publicly available, or have access restrictions, the range of products and formats in which the data are made available and the associated costs.

Source: ABS (2009).

Evidence quality

The quality of education evidence crucially depends on the methods used to generate such evidence. In some Australian jurisdictions, as well as internationally, there have been efforts to classify the quality or 'strength' of education evidence according to particular characteristics, such as research design and methodologies (box 2.4).

These classification frameworks vary, but have as a common aim that decisions about programs, practices and investment of resources are informed by rigorous, methodologically sound evidence on the effectiveness of particular interventions (CESE 2016c; QldDET 2016b). For example, in developing the *Teaching and Learning Toolkit*, the UK-based Education Endowment Foundation reports the quality of evidence on a five-point scale that takes into account:

- the quantity of evidence (the number of systematic reviews or meta-analyses and the number of primary studies that they synthesise)
- the methodological quality of the primary studies
- the consistency of the results across the studies reviewed (EEF 2016b).

Box 2.4 Quality of education evidence — examples

Centre for Education Statistics and Evaluation

The NSW Centre for Education Statistics and Evaluation has developed an ‘evidence hierarchy’ that classifies education evidence according to three standards, based on the strength of the evidence for detecting effectiveness in education treatments, interventions or programs.

- Gold standard evidence: evidence from individual randomised controlled trials or from meta-analyses (summaries or syntheses) of such trials. (Randomised controlled trials are studies in which subjects are randomly assigned to a treatment or control group.)
- Silver standard evidence: evidence from individual quasi-experiments or from meta-analyses of quasi-experiments. (Quasi-experiments are studies that lack randomness in the assignment of subjects to treatment or control groups.)
- Other evidence: evidence that is not considered to provide a clear indication of effectiveness but may help provide some indication where no other evidence is available. It may include evidence derived from pre–post comparisons (studies that observe subjects before and after a treatment, rather than using control groups) or from expert opinion.

Teaching and Learning Toolkit

The *Teaching and Learning Toolkit*, developed by the UK-based Education Endowment Foundation, defines five levels of evidence quality.

- Very extensive: consistent high-quality evidence from at least five robust and recent meta-analyses, where the majority of the included studies have good ecological validity, and where outcome measures include curriculum measures or standardised tests in school subject areas.
- Extensive: three or more meta-analyses from well-controlled experiments mainly undertaken in schools using student achievement data with some exploration of causes of any identified heterogeneity.
- Moderate: two or more rigorous meta-analyses of experimental studies of school-age students with cognitive or curriculum outcome measures.
- Limited: at least one meta-analysis or systematic review with quantitative evidence of impact on achievement or cognitive or curriculum outcome measures.
- Very limited: quantitative evidence of impact from single studies, with effect size data reported or able to be calculated. No systematic reviews with quantitative data or meta-analyses located.

Sources: CESE (2016c, 2016d); EEF (2016b).

However, such hierarchies of ‘quality’ are contested, and several inquiry participants cautioned against universal prescriptions about what constitutes good evidence (AARE, sub. 22, sub. DR114; ARACY, sub. DR116; Deakin University School of Education, sub. DR136; STEM Education Research Centre, sub. DR123; Universities Australia, sub. DR121). In particular, these participants argued that although randomised controlled trials are a useful and valuable methodology in some circumstances, they are not necessarily fit for purpose or deployable for every research problem, particularly given the complex nature of education outcomes. Instead, participants suggested that using a variety

of research methodologies, including case studies, longitudinal analyses or evaluation of pilot tests, would enrich the evidence base — particularly in relation to determining exactly what ‘worked’ in certain cases and how it could be implemented across different contexts (ARACY, sub. DR116; Deakin University School of Education, sub. DR136). These matters are discussed further in chapter 7.

2.6 Cost-effectiveness of the evidence base

Data and evidence can generate value insofar as they contribute to informed decision making and improved outcomes, and promote transparency and accountability. At the same time, developing the education evidence base imposes a range of costs.

These include costs associated with monitoring and benchmarking, including collecting and processing existing and additional data collections, as well as standardising data definitions. They also include the costs associated with evaluation, translation and communication, and implementation of evidence.

The distribution of these costs is relevant in considering the design and arrangements of a national education evidence base. Additional data collections, requirements or processes may be more burdensome for those schools, ECEC services, and state and territory governments with more limited resources. Schools and ECEC providers may also face higher costs in relation to creating and using evidence, reflecting their diversity in size, remoteness and affiliation. For example, schools and ECEC providers in remote areas may be subject to higher costs of network connection and use in relation to collecting, accessing and sharing data and evidence (chapter 4).

Under the framework set out in this chapter, the education evidence base should add value, meaning that data and evidence generate additional benefits in excess of additional costs, and these net benefits should also be greater than those of alternative options for achieving a similar objective. It bears emphasising that the primary aim of the education evidence base is to generate value in terms of improved education outcomes, rather than offering benefits for non-education sectors. Although other sectors (such as health) could potentially gain from drawing on information in the education evidence base, those gains would be considered of secondary importance, given that the cost burden of the education evidence base is likely to fall squarely on those in the education sector.

In assessing the costs and benefits of an education evidence base, it is also important to consider the costs and benefits of undertaking education reforms, or maintaining existing initiatives and programs that are not sufficiently supported by evidence. The overall net benefits that would flow from an effective evidence base may substantially outweigh the net benefits associated with implementing programs unsupported by robust evidence, where such programs are costly yet offer limited or no improvement in education outcomes.

3 Gaps in education data and evidence

Key points

- Although there are some gaps in education data collections, and some more significant gaps in evidence, the biggest gap relating to education evidence in Australia lies in its application — that is, how evidence is translated, communicated and implemented by education decision makers.
- All Australian governments and a number of organisations invest considerable effort in collecting and reporting data and creating and sharing evidence on early childhood education and care (ECEC) and school education.
- Data are collected on individual children and young people, schools and ECEC services, and the education workforce. Most data reporting relates to monitoring and benchmarking.
- There are quality issues in ECEC and school education data but quality is improving. Decisions to change data collection practices to address a data quality issue should be guided by the following considerations:
 - is the existing quality of the data fit for purpose?
 - if there is a case to improve data quality, is improvement feasible?
 - are alternative ways of obtaining the required data available?
 - would there be a net benefit to improving data quality?
- There are gaps in existing data collections, but work in train should fill many of them. They include better information on:
 - learning outcomes of school students before Year 3
 - broader student outcomes, particularly non-cognitive capabilities and 21st century skills (such as critical and creative thinking), and wellbeing and engagement
 - students with disability, the education workforce and some external influences on learning outcomes (such as parental engagement).
- New cohorts of children should be established for the *Longitudinal Study of Australian Children*. Linking this study to administrative data could reduce the study's cost and leverage the value of these data.
- There is a lack of evidence about some aspects of education in Australia. Three broad areas that could be strengthened include:
 - evidence on how ECEC quality and attendance are associated with education outcomes
 - the use of value-added approaches to measure growth in achievement over and above that expected, given the external influences relating to the school and the student
 - the creation of evidence on what works best in education settings.
- Improving access to existing data and supporting data linkage initiatives would help to facilitate the creation of evidence.
- Efforts to support the translation and communication of evidence, and its implementation by decision makers, are required to improve how evidence is used in education settings.

An evidence-based approach to improving education outcomes requires two complementary activities — monitoring progress against stated objectives and evaluating and applying what works best to improve student outcomes (chapter 2). Monitoring requires accurate measures of education outcomes for students, and data about contextual factors that influence outcomes. Evaluation requires data that can help identify causes of variation in performance of students and schools and that can support the evaluation of policies, programs and practices targeted at improving outcomes. To improve outcomes in practice, it is also necessary to translate and communicate evidence for decision makers, and for them to apply it.

This chapter examines existing education data and evidence in Australia (section 3.1) and ways in which these data and evidence could be improved to support better monitoring and evaluation, with the ultimate goal of improving education outcomes. Issues relating to the quality of data collections are raised and a framework for considering them is outlined (section 3.2). Gaps in national education data collections (section 3.3), education evidence (section 3.4), and the use of education evidence (section 3.5) are then discussed. Although there are some gaps in data, and some more significant gaps in evidence, the biggest gap lies in the application of evidence.

In deciding which data quality issues and gaps to focus on, the Commission has taken account of submissions by inquiry participants and those suggestions that have the largest potential to improve national monitoring and evaluation in the short to medium term. Appendix B presents a summary of all data quality issues, data gaps, evidence gaps, and evidence creation and use gaps raised by inquiry participants.

3.1 The Australian education data and evidence base

All Australian governments and a large number of organisations invest considerable effort in collecting data on ECEC, school education and the external influences that affect education outcomes. A selected list gives a sense of the volume of data collected (table 3.1). Most of these data are collected for monitoring purposes; relatively few are collected for the purpose of evaluation. A detailed description of existing education data collections is presented in appendix C.

Data are reported in a range of ways, including annual reports and regular statistical publications, and through avenues such as reports to parents and online portals (for example, *My School*). Most data reporting pertains to monitoring and benchmarking, and contributes to accountability and transparency in the education sector.

Australian governments and research organisations also produce a substantial amount of education evidence. Evidence on what works best to improve student outcomes is shared through evidence repositories, which include clearinghouses (for example, the *Teaching and Learning Toolkit*) and peer-reviewed journals, as well as through partnerships and networks of education providers and students' families. Key avenues through which evidence is shared are described in appendix C.

Table 3.1 Selection of Australian data — education and external influences^a

<i>Type of data</i>	<i>Collection</i>
Early childhood education and care (ECEC)	
Children, staff and providers	<ul style="list-style-type: none"> • Preschool Census • National ECEC Collection (NECECC) (preschool) • Child Care Management System (CCMS) (childcare)
Child development	<ul style="list-style-type: none"> • Kindergarten Development Check (preschool — Tasmania) • School Entry Health Assessment (preschool — Western Australia) • Australian Early Development Census (AEDC)
Staff	<ul style="list-style-type: none"> • National ECEC Workforce Census
Service providers	<ul style="list-style-type: none"> • National Quality Agenda IT System (NQA ITS)
School education	
Students, staff and schools	<ul style="list-style-type: none"> • School Census • National Schools Statistics Collection (NSSC)
Student outcomes	<ul style="list-style-type: none"> • On-entry assessment^b • National Assessment Program — Literacy and Numeracy (NAPLAN) • National Assessment Program (NAP) sample assessments • Programme for International Student Assessment^c (PISA) • Trends in International Mathematics and Science Study^c (TIMSS) • Progress in International Reading Literacy Study^c (PIRLS) • International Computer and Information Literacy Study^c (ICILS)
Student wellbeing	<ul style="list-style-type: none"> • Australian Child Wellbeing Project • Tell Them From Me (New South Wales) • Student Health and Wellbeing Survey (Victoria) • Middle Years Development Instrument (South Australia)
Other student characteristics	<ul style="list-style-type: none"> • National Data Collection • Nationally Consistent Collection of Data on School Students with Disability (NCCD)
Teachers	<ul style="list-style-type: none"> • Higher Education Statistics Collection • Staff in Australia's Schools Survey (SiAS) • Teaching and Learning International Survey (TALIS)^c
Longitudinal data	
Children and students	<ul style="list-style-type: none"> • Longitudinal Study of Australian Children (LSAC) • Longitudinal Study of Indigenous Children (LSIC) • Longitudinal Survey of Australian Youth (LSAY)
External influences	
Health	<ul style="list-style-type: none"> • National Perinatal Data Collection • Medicare data
Social services	<ul style="list-style-type: none"> • Centrelink data — including receipt of Family Tax Benefit • Child protection data
Demographics	<ul style="list-style-type: none"> • Census of Population and Housing • Household, Income and Labour Dynamics in Australia Survey (HILDA)
Labour force	<ul style="list-style-type: none"> • Labour Force Survey • Survey of Education and Training

^a National data unless otherwise stated. ^b Collection name and content vary across jurisdictions. ^c International initiative.

3.2 Data quality issues

Quality issues exist but quality is improving

Inquiry participants identified a number of data quality issues. A selection of these is outlined in box 3.1, and a summary of all issues raised by participants is contained in appendix B. In general, data quality issues were more commonly raised about ECEC data than school data due to the fragmented and sector-specific nature of ECEC data collection (FDCA, sub. 63; Mitchell Institute, sub. DR103; NSW Government, sub. 79; Victorian Government, sub. DR144).

Many inquiry participants argued that there is a need to improve the quality of administrative data to facilitate inter-jurisdictional comparisons and support more in-depth research and analysis (for example, ECA, sub. 71; QUT Faculty of Education, sub. 19). Some also argued that better data are needed to support service planning, practice improvement and child outcomes (Goodstart Early Learning, sub. DR135) and to guide policy decisions (Mitchell Institute, sub. DR103). Overall, better data quality would support more robust monitoring, research and evaluation, to produce higher-quality evidence for use in policy and practice.

Box 3.1 An overview of data quality issues

Timeliness issues relating to some early childhood education and care (ECEC) data were raised, for example, by the Telethon Kids Institute (sub. 15) and Family Day Care Australia (sub. 63). The Australian Government Department of Education and Training (sub. 68, p. 5) noted that '[t]here are opportunities to examine the timing and regularity of data collections within the early childhood education sector ...'.

Accuracy issues were raised, for example, by the Independent Schools Council of Australia (sub. 39) in relation to data collected by schools on student and parent background. Likewise, Catholic Education Melbourne (sub. 72) raised issues in relation to incentives for schools to misreport data in the *Nationally Consistent Collection of Data on School Students with Disability* in order to secure more resources.

A number of coherence (consistency and comparability) issues were raised, particularly about ECEC data. General issues of consistency with ECEC data were raised by Goodstart Early Learning (sub. DR135), Mitchell Institute (sub. DR103) and the NSW Government (sub. DR145). Inconsistencies in attendance data between jurisdictions and sectors were nominated by Early Childhood Australia (sub. 71) (for preschools) and the Australian Institute of Health and Welfare (sub. 55) (for preschools and schools). Inconsistencies in data collected on teacher education and the teaching workforce were raised as areas of concern by the National Catholic Education Commission (sub. 49). Furthermore, issues relating to variation between teachers in the collection of data on student disability were identified by Children and Young People with Disability Australia (sub. 66).

Interpretability issues due to a lack of metadata (information about the content and characteristics of a dataset) were raised, for example, by the Fraser Mustard Centre (sub. 52) and the Telethon Kids Institute (sub. 15).

Although issues exist, data quality has been improving (and there are commitments to further improvements). For example, the Australian Curriculum, Assessment and Reporting Authority (ACARA) and the Australian Government Department of Education and Training have been addressing quality issues in school education data. A *Data Standards Manual: Student Background Characteristics* has recently been created (ACARA 2016c). Work to improve the collection of attendance data is also underway — in 2012, education authorities in all jurisdictions agreed to the *National Standards for Student Attendance Data Reporting* for students in Years 1 to 10 (ACARA 2015f). The standards were implemented in non-government schools across Australia in 2013, in government schools in all states and territories except for New South Wales in 2014, and implementation commenced in government schools in New South Wales from 2016. In addition, support is being provided to educators to improve their collection of data for the *Nationally Consistent Collection of Data on School Students with Disability* (DET, sub. 68).

The Australian Institute of Health and Welfare has also put work into a national education data standards strategy (box 3.2).

Box 3.2 Development of a national education and training data standards strategy

From 2013 to 2014, the Australian Institute of Health and Welfare developed a national data strategy and implementation plan to improve the coherence of information across the education and training sector. The work was endorsed by the Education Council and overseen by the Council's Data Strategy Group and the Strategic Cross-sectoral Data Committee, as part of the *Transforming Education and Training Information in Australia 2013–2014 Forward Work Program*.

The project had three phases: establishing the scope of the project, reviewing data collections and developing the national data standards strategy. In the second phase, a number of priority data items were proposed for further development, including: Indigenous status; remoteness; socioeconomic status; disability; proficiency in English; parental education and occupation; geography; and a range of education items including current and previous institution, type of institution, attendance and enrolment status.

An implementation plan that would help achieve the priorities was outlined during the third phase. The plan considered a number of issues, including benefits, relevance to policy priorities, effort required, and existing and planned projects that aimed to improve collections and standards.

Source: AIHW (2015a).

A framework for evaluating potential responses to data quality issues

While current initiatives to address data quality issues are welcomed, there is scope for further improvements. However, although there may be substantial benefits in improving data quality in some areas, improvements in other areas may be limited by practical constraints. Any decision to change data collection practices to address a data quality issue should be guided by the following considerations.

Is the existing quality of the data fit for purpose?

Are the data fit for the purpose for which they are collected and used? A desire to address data quality issues can arise because the data are not fit for the original purpose of data collection, or because they were not intended for an additional purpose. Administrative data, for example, are often collected to support the day-to-day operations of a service provider or school system, and may not be suitable for use in research. The case for addressing data quality issues is stronger when data are less fit for purpose. However, decisions on whether to improve data quality must take into account a broader range of practical considerations.

If there is a case to improve data quality, is improvement feasible?

Can the quality of the data readily be improved, given the manner or context in which the data are collected? For example, schools collect a range of data from parents through enrolment forms and thus have limited control over the accuracy and coherence of the data. While it might be feasible to improve the accuracy and coherence of some parent-reported data by altering existing data fields, in other cases it is harder due to the incentives to misreport. Parent-reported data on occupation and education, for example, are used to determine school funding at both state and national levels — potentially creating an incentive for parents to underrepresent their education and occupation status. In the Independent school sector, parents might have an incentive to overstate their education or occupation to appear more reliable or suitable for the school community (ISCA, sub. 39). The case for addressing data quality issues is stronger when there is a higher likelihood that an initiative to improve data quality will be successful.

Are alternative ways of obtaining required data available?

Are there approaches other than changing the quality of data items collected that could create the data necessary for a specific purpose? For example, data linkage, or new fit for purpose collections (including sample data) may be more effective options.

Would there be a net benefit in improving data quality?

Would it be costly to improve data quality? Imposing alternative data standards or definitions onto a data collection could reduce its value for its original purpose and, in some cases, the costs of enforcing consistency could be high, if not prohibitive. Some issues of jurisdictional data comparability identified in the ECEC sector, for example, are due to differences in service models and are difficult to resolve. The Tasmanian Government (sub. 75, p. 6) noted that:

... comparability issues are often not due to a difference in data standards but are due to the differences in education delivery as well as differences in the structure of populations being compared.

Likewise, it would be unreasonable from a cost perspective to impose national standards on all administrative data collected within ECEC providers and schools simply because of the possibility that those data could be used to create evidence about policy or practice. There must be a clear benefit from improving the quality of data collected, and this benefit — for example, opportunities for valuable research that would not otherwise be possible and flow-on effects from the research findings — must outweigh the costs. Costs can include the administrative costs borne by data custodians and compliance costs borne by those responsible for collecting and submitting the data (chapter 4). These costs are not always equally distributed across those who benefit from data quality improvements. For example, researchers may experience benefits from using higher-quality data without assuming many of the costs of collection. In contrast, teachers who collect the data may have to wait for any useful research findings to be translated into usable material before they benefit from the improved data quality.

As the Australian Institute of Health and Welfare (2015a, p. 19) noted:

The addition or modification of data items in education and training collections to improve consistency requires considerable investment of resources to review, standardise and endorse changes, and subsequently implement changes across multiple systems. Aligning the [national data standards] strategy with policy priorities, and particularly where there are critical gaps in reference to policy, provides a sound basis and demonstrated value for the implementation of changes ...

As costs increase relative to potential benefits, the case for addressing data quality issues is weaker.

RECOMMENDATION 3.1

In assessing whether to improve the quality of existing education data, governments should examine on a case-by-case basis whether:

- the existing quality of the data is fit for purpose
- data quality improvements are feasible given the context of data collection
- other options are available
- the benefits of improving data quality exceed the costs.

3.3 Gaps in data collections

An assessment of gaps could focus on classroom, state and/or national level data. Although collections at each level play an important role in supporting decision makers in the education system, the Commission has been asked to provide advice on the national approach to collecting and using data. Therefore, the focus in this section is on gaps in national data on education outcomes. Not considered in depth in this section are data

access or linkage issues. In many cases, data are collected but are not reported on or made available outside of their original purpose. These do not constitute data gaps per se. Data access and linkage issues are discussed in chapters 5 and 6.

Steps to address a national data gap could also focus on collecting data from the whole population or from a sample. The decision should include consideration of which approach is most fit for purpose. For example, if the purpose is to provide information on outcomes for each individual, a census collection may be required. On the other hand, if the primary purpose is to provide a system-level indicator of performance, a sample may be sufficient. Chapter 4 contains further discussion about the relative benefits of sample and census data.

Gaps in data on early learning outcomes

National learning frameworks for ECEC describe the importance of assessing children's learning and development against early learning objectives (ACECQA 2013a). Educators are required to collect assessment data and to use it to inform their programs and practices. In other words, the purpose of these data is to inform educators. Consistent with this purpose, the *Early Years Learning Framework* (EYLF) (chapter 1) notes that there are many ways in which children demonstrate learning across the outcomes, and provides examples (DEEWR 2009). Specific measures for the outcomes are not stipulated. Similar approaches to monitoring children's early learning outcomes are used internationally (OECD 2015c).

A number of inquiry participants submitted that early learning outcomes (both cognitive and non-cognitive) should be measured on a nationally consistent basis before the start of formal schooling. Two separate arguments in support of this were given: to support the monitoring of progress against Australia's early learning objectives; and to help identify children who would benefit from early intervention. These arguments, as well as the challenges in collecting data on early learning outcomes and potential solutions, are discussed below.

Monitoring progress against early learning objectives

The ability to take a national view of children's outcomes in a systematic and consistent way would be useful for monitoring how Australia is progressing in achieving the learning outcomes in the EYLF. The data might identify areas of development needing extra policy attention, and could be useful for examining how changes in government policy affect children's outcomes. Speech Pathology Australia (sub. 35, p. 17) commented that:

Despite the [EYLF] being a national educational policy, there does not exist any systematic, consistent collection of data at a national level to determine if these outcomes are being achieved by Australian children in the year prior to starting formal schooling.

Triennial data on early learning outcomes are currently collected through the *Australian Early Development Census* (AEDC) during a child's first year of full-time school (appendix C). Some inquiry participants considered that this data collection was an important source of information and was able to provide community-level insights into

progress against some of Australia's early learning objectives (for example, ACECQA, sub. DR108; Mitchell Institute, sub. DR103; PHRN, sub. DR110). However, others noted that because it is a subjective measurement completed by teachers, it is not designed to be a diagnostic tool for individual children (CIS, sub. DR126; Deakin University School of Education, sub. DR136; DET, sub. DR143; NCEC, sub. DR106).

While it was considered to be valuable, there was a general consensus that use of the AEDC alone was insufficient to monitor early learning outcomes. For example, the Telethon Kids Institute (sub. DR129, p. 1) submitted that:

1. Until such time as the early learning objectives are clarified it is premature to identify which measures might be suitable.
2. The AEDC is conducted every three years. The time between censuses will reduce the ability of stakeholders to monitor the impact of policy changes in the short term.
3. The AEDC is focused on identifying vulnerabilities. This means areas of relative strength are unable to be identified and built upon.

The Queensland Government (sub. DR142, p. 8) noted:

... consideration would need to be given to: the broader influences on early childhood development, including family influences; that not all children for whom the AEDC is collected attended an early childhood education and care program; and the fact that teachers complete the AEDC based on skills and competencies required for school, which may not reflect the desired outcomes at the end of the preschool year.

There were also some disparate views on how well the domains measured in the AEDC reflect outcomes identified in the EYLF. For example, the University of Tasmania Faculty of Education (sub. DR90) stated that, although there is overlap, they do not map onto each other entirely. Conversely, the Murdoch Childrens Research Institute (sub. DR92) submitted that, to achieve the learning outcomes in the EYLF, children need to be competent in the domains assessed within the AEDC. This disparity is likely to be partly due to differences in the framing of learning outcomes and domains in the EYLF and AEDC respectively, making it difficult to draw comparisons.

Identifying children who would benefit from early intervention

Another argument in favour of a national assessment of early learning outcomes is to help identify vulnerable children and direct early intervention strategies to improve later life outcomes. Children who may benefit from early intervention can include those with disability, those showing signs of developmental delay, or those at risk of poor education outcomes due to socioeconomic or cultural factors (Leseman 2002). The Melbourne Graduate School of Education (sub. 54, p. 3) stated that:

The lack of nationally consistent data on young children's competencies results in no consistent way to know how children are faring in the years *before* school, and the relation of this to their later school achievement ... While [data available at the first year of school are] valuable, this collection cannot effectively direct early childhood interventions. It is well established that gaps in cognitive outcomes emerge very early, and are predictive of later outcomes.

Challenges in collecting data on early learning outcomes

Although a new national assessment of children before entering school would have benefits, there are challenges associated with assessing early development outcomes. A recent report on the costs and benefits of instruments used to measure children's early learning outcomes cautioned that the data collected tend to lack reliability because children develop at very different rates in their early years (Barnett, Riley-Ayers and Francis 2015). Early Childhood Australia (sub. 71, p. 8) expressed similar views and suggested that a new data collection on early childhood outcomes before the start of formal schooling might not be warranted:

Children's development is not linear and so it can be difficult to measure and use data on how children are developing during this period, as children may develop differently. The AEDC, as well as later data such as NAPLAN, already reflect on what has occurred during the first five years, and may be used to research early childhood education effectiveness. However, in order to do this, there needs to be an effective administrative data set which spans the first five years.

An issue also arises with the collection of data on children who do not attend ECEC. Many inquiry participants supported the inclusion of these children within the scope of the national education evidence base. However, because these children are not yet participating in education, data on these children's outcomes would likely have to be collected from outside of the education sector.

Existing data can be used to support progress monitoring and early intervention

For monitoring purposes, existing data can be used, rather than a new data collection. A number of participants suggested that the AEDC should be considered alongside other datasets on early childhood experiences and outcomes (for example, ACECQA, sub. DR108; Goodstart Early Learning, sub. DR135; Mitchell Institute, sub. DR103; PHRN, sub. DR110). The Population Health Research Network (sub. DR110, p. 2) stated that this would 'enable more robust monitoring and reporting', and Goodstart Early Learning (sub. DR135, p. 6) said that it would provide 'a more holistic understanding of [a] child's education experiences'. There was strong support for greater data linkage between the AEDC and other ECEC datasets, as well as later data collections such as NAPLAN. Data collected through child and family health checks (described below) can also provide some of the information required to measure progress against early learning objectives before the first year of school.

Existing data can also be used for identifying children who would benefit from early intervention. Some data on children's developmental outcomes that would be relevant are collected through child and family health services. These services are primarily delivered through state and territory governments, and there are inconsistencies in how they are delivered across jurisdictions (AHMAC 2011).

However, the Australian Research Alliance for Children and Youth (sub. DR116, p. 16) commented that these services are valuable for identifying children who would benefit from early intervention:

... child and family health nurses and/or general practitioners at present conduct periodic growth and developmental assessments in the years prior to children commencing formal schooling. These are used to identify early signs of speech, language, motor skill and other developmental delay, and facilitate early intervention via referral to targeted services. This early engagement with preventative health care is an essential feature of the Australian system and near universal.

These views are also reflected in the *National Framework for Universal Child and Family Health Services*:

Universal child and family health services focus on increasing protective factors and reducing risks that impact on children's health and wellbeing and provide early identification and referral for children and families who may require targeted, secondary or tertiary specialist services. (AHMAC 2011, p. 9)

While this National Framework covers children from birth to the age of eight, child and family health services generally focus on the first 12 months after birth, with ongoing consultations thereafter occurring less often (AHMAC 2011). The Victorian Department of Education and Training (2016a, p. 13) reported that:

While nearly all newborns in Victoria are visited by [a maternal and child health] nurse at home for their initial consultation, rates of participation in the [maternal and child health] visits drop off as the child gets older. Although participation rates at the final (3.5-year) consultation increased slightly in 2014, one third of families are not participating in the final consultation.

Initiatives to engage families and promote use of these services would provide data that could be used to identify children who might be vulnerable to poorer education outcomes. Where a development issue or support need is identified, the service should provide an appropriate pathway for response (for example, referral to targeted services) (AHMAC 2011).

Early Childhood Australia (pers. comm., 3 November 2016) expressed the view that:

... while it is not clear the extent to which early interventions currently are being effectively targeted, the [maternal and child health] service is proof of concept of relatively universal access to, and gathering data from, the cohort of children below school age.

Early identification could also involve looking at the characteristics of parents and families in existing data, to identify children who might be at risk of poorer education outcomes due, for example, to socioeconomic factors. This is discussed further in the section below on external influences on education.

The Commission concludes that a new national assessment of early childhood outcomes before the start of schooling is not necessary at this stage. However, existing data could be more efficiently utilised through improving access to data (chapter 5) and data linkage

(chapter 6). Improvements in ECEC data quality should also be pursued, subject to the considerations in recommendation 3.1. An expert mapping of the learning domains of the AEDC onto the outcomes of the EYLF would show what data are needed to supplement the collection. Better data could help fill gaps in the evidence on ECEC — these gaps and some of the linkage projects that are underway are discussed in section 3.4.

Gaps in data on school education outcomes

A range of school education outcomes are assessed through the *National Assessment Program* (NAP) (which includes NAPLAN, the NAP sample assessments and four international sample assessments of students (appendix C)). However, limitations with the NAP and its capacity to inform decision making have been raised. First, assessments are only administered to students from Year 3. Outcomes of students in earlier years are not assessed on a nationally consistent basis. Second, the NAP does not cover a number of areas that are considered important to student development, such as non-cognitive outcomes. Third, the assessments used in the NAP might not accurately measure outcomes for some groups of students, such as those with disabilities.

Steps are in train to conduct an early assessment of student outcomes

Some inquiry participants have argued that students' cognitive outcomes should be assessed and monitored on a nationally consistent basis earlier than NAPLAN in Year 3 (for example, AASE, sub. 30; ACARA, sub. 62; ACER, sub. 32; de Lemos et al., sub. 6; Meyer, sub. 34). An area of assessment that received particular attention from participants is phonics, which research finds is an important factor in reading outcomes (box 3.3).

Early assessments of student outcomes support early intervention for school skills

Monitoring school education outcomes at an early age would help to identify students who have not developed the early skills necessary for further progress, so that interventions can be targeted towards them. For example, de Lemos et al. (sub. 6, p. 1) submitted that:

... a weakness of the NAPLAN testing is that Year 3 is too late to identify students who have failed to develop the essential early reading skills that provide the basis for subsequent literacy development.

Evidence suggests that addressing reading problems early is less costly than later interventions and increases the chances that the student will catch up (Pfeiffer et al. 2001). According to the US National Institute of Child Health and Human Development, it takes four times as much assistance to improve a student's reading skills if help is delayed until Year 4 than if it is provided in their first year of school (Pfeiffer et al. 2001).

Box 3.3 Phonics assessment

Phonics has been a recurring topic in material relevant to the current inquiry. For example, the Australian Government recently announced a Year 1 assessment that would include phonics (Birmingham 2016). Phonics also received attention from a number of participants (for example, AASE, sub. 30; CIS, sub. DR126; de Lemos et al., sub. 6; Hempenstall, sub. 1; Howell, sub. DR117; Meyer, sub. 34, sub. DR88).

Phonics is a method of learning to read that involves understanding the sounds that individual letters and combinations of letters make (Walker et al. 2015). The importance of phonics to the teaching of reading was acknowledged in the *National Inquiry into the Teaching of Literacy* (NITL 2005). Although the inquiry found that teachers should be able to draw on multiple techniques suited to the needs of individual children, systematic phonics instruction was deemed to be critical to children learning to read (NITL 2005). The UK Education Endowment Foundation's *Teaching & Learning Toolkit* also indicates that phonics instruction is an effective method for supporting younger readers, based on extensive evidence (EEF 2016d).

Evidence of the benefits of a national phonics assessment is available from the United Kingdom. A teacher-administered Year 1 *Phonics Screening Check* was introduced in 2012 to help identify children who may need extra support to improve their decoding skills (their ability to recognise sounds that letters and combinations of letters make, and blend the sounds to form words). An evaluation of the check suggested that it has led to improvements in the teaching of phonics and in student performance in phonics (Walker et al. 2015). Reading and writing attainment and progress improved both before and after the introduction of the phonics screening check — however, no improvement could be clearly attributed to the check due to methodological limitations such as the absence of a comparison group and the concurrent implementation of other phonics policies (Walker et al. 2015).

While this international evidence may not be directly applicable to Australia, there are parallels between the UK and Australian education systems. Hence the introduction of a phonics assessment in Australia has the potential to improve teaching and student performance in phonics.

Early student assessments are used in Australia at a jurisdictional level and internationally

All states and territories have standardised assessments at school entry (such as the *Performance Indicators in Primary Schools* assessment in Tasmania and the ACT (appendix C)). These are typically compulsory in government schools only. Recent announcements indicate that Australia is moving towards a national Year 1 assessment through the student achievement plan, which includes an additional \$1.2 billion in funding over three years from 2018 (Birmingham 2016). In particular, one element of the plan is to:

Undertake a standardised Year 1 school assessment of students' reading, phonics and numeracy skills to ensure the earliest possible interventions occur for students who need additional help. (Birmingham 2016, p. 1)

Internationally, national assessments tend to begin in later years of schooling. However, some countries in addition to the United Kingdom have introduced student assessments in the earlier years of schooling. For example, in the Netherlands, national assessments begin from Year 1 and support longitudinal student monitoring (box 3.4). In Norway, the results of compulsory national ‘mapping tests’ in Years 1 to 3 are used by schools, students and parents to identify students who may need extra support (Nusche et al. 2011). These tests are low-stakes for schools — the results are not used for school accountability purposes or registered nationally. A 20 per cent sample is collected for national analyses and to establish a benchmark for the lowest 20 per cent of achievers who might need extra support.

Box 3.4 The Netherlands’ *Leerling Volg Systeem* — a longitudinal student monitoring system

In the Netherlands, since the 2014-15 school year, primary schools have been required to implement a student monitoring system to regularly assess their students’ progress. Schools retain the freedom to choose the provider and frequency of test administration. The *Leerling Volg Systeem*, developed by the Central Institute for Test Development (*Centraal Instituut voor Toetsontwikkeling*, CITO), is the system most commonly used by primary schools.

CITO offers tests, to be taken once or twice a year, in the following subjects for students in Years 1 to 8 (primary school in the Netherlands):

- Years 1 and 2: ordering, language and orientation in space and time
- Years 3 to 8: Dutch language, mathematics, social and emotional development
- Years 6 to 8: world orientation (geography, history, biology), science and technology
- Years 7 and 8: English.

Tests within a subject area are linked so that student progress can be tracked.

CITO also offers tests for the first two years of secondary school — at the beginning of secondary school and at the end of the first and second years. Four subject areas are tested: Dutch reading comprehension, English reading comprehension, mathematics and study skills. These are offered at three different levels of difficulty, corresponding to the three tracks in the Dutch education system (pre-vocational, general and pre-university).

Source: Nusche et al. (2014).

Nationally consistent assessment of early outcomes in school would bring benefits

Nationally consistent assessment would bring a number of benefits over separate assessments for each jurisdiction. For example, it would enable all students to be assessed, including in cases where current state regimes are voluntary. The data could then be used to establish a national benchmark to identify students who might need extra support. At an aggregate level, the data could be used to show how cohorts of Australian students perform over time in response to broad policy changes. The ability to link early assessment data to other data sources would further leverage their value. For example, linking to later school outcomes (such as NAPLAN results from Year 3 and onwards) would be useful for

tracking individual student progress over time from an earlier starting point, and linking to early childhood data would enable pathways through ECEC to be examined. These data could also be used for value-added analysis (section 3.4).

Some participants raised concerns about an additional assessment in Year 1, noting, for example, that it has the potential to duplicate existing local and state assessments (Queensland Government, sub. DR142) and place additional burdens on teachers and students (IEUA, sub. DR109; Steiner Education Australia, sub. DR124). The Independent Education Union of Australia (sub. DR109, p. 4) contended that there is already ‘an extraordinary level of data collection of the individual learning outcomes of every student’ in the first two years of schooling. An approach towards a nationally consistent assessment should involve collaboration between all school education sectors and take into account how the assessment can improve on, rather than duplicate, existing assessments that are in place, so that it does not significantly add to the burden on teachers and students.

Furthermore, the amount of time between when a national early student assessment is conducted and when the results are available to students and teachers should be short. This would ensure that the results of the assessment are able to inform school teaching practices and target interventions in real time. That said, the OECD found that teachers have difficulties interpreting and effectively using information generated by national assessments, including early school assessments, to improve teaching and learning (for example, Nusche et al. 2011, 2014; Santiago et al. 2011; Shewbridge et al. 2011). In order for any further national assessments to be used to their full potential in Australia, teachers need to have the capacity and capability to effectively use the results to inform their teaching. This issue is discussed further in chapter 7.

Steps are in train to broaden the types of outcomes that are assessed

The literacy and numeracy outcomes of students are routinely assessed on a nationally consistent basis through NAPLAN, and assessments of some additional outcomes exist through the NAP sample assessments. However, there are other education outcomes that are important to Australia’s education objectives. For example, the *Australian Curriculum* includes outcomes such as critical and creative thinking, personal and social capability, ethical understanding and intercultural understanding (ACARA 2015a), but there are no national assessments of these capabilities.

Many inquiry participants expressed a view that a broader range of outcomes should be assessed in order to monitor how children are developing. For example, the Australian Government Department of Education and Training (sub. 68, p. 3) stated that:

Ministers have agreed that education goes beyond literacy and numeracy skills, and that education plays a vital role in promoting the intellectual, physical, social, emotional, and other elements of well-being of young Australians. As part of a high quality education evidence base, issues such as measuring non-cognitive development are challenging. However, they are important to understanding the wider influences on learning and making young people active and engaged citizens.

The fact that the outcomes tested within NAPLAN are limited has also been noted in external reviews (for example, Gonski et al. 2011; Santiago et al. 2011). This is a potential concern if NAPLAN results are overemphasised in decisions about Australia's education system (Santiago et al. 2011).

Non-cognitive capabilities, '21st century skills' and student wellbeing and engagement have received the most attention from participants (appendix B).

Non-cognitive capabilities and 21st century skills

Non-cognitive capabilities and 21st century skills encompass a wide range of attributes, including perseverance, sociability, creativity, problem solving, communication and teamwork (McGaw 2013; OECD 2015b). The value of these skills is generally recognised. The OECD recently reported on the importance of developing these capabilities in order to adapt to economic, social and technological challenges (OECD 2015b). Research evidence also suggests that non-cognitive skills are associated with better academic, employment and life outcomes (Gabrieli, Ansel and Bartolino Krachman 2015). Teachers have a role to play in developing children's social and emotional skills (OECD 2015b).

Although these skills tend to be seen as harder to measure than cognitive skills, some assessment methods exist. Measures have been developed using self-reports, teacher-reports, performance in specific tasks (including through experiments and psychometric observational studies) and administrative records of student behaviours (OECD 2015b). However, the subjective nature of some of these measures means they could be affected by bias. As a result, it has been suggested that they are ill-suited to use for school accountability, but that there is scope to develop them further for use in program evaluation and practice improvement (Duckworth and Yeager 2015).

In Australia, ACARA is investigating the possibility of embedding some general capabilities that are contained in the *Australian Curriculum* (such as critical and creative thinking, ethical understanding, intercultural understanding and personal and social capability) into current NAP sample assessments (ACARA, sub. 62, sub. DR147). The Victorian Curriculum and Assessment Authority is also working in partnership with the Mitchell Institute on a project to develop teaching and assessment strategies for these same general capabilities (Mitchell Institute 2016, sub. 31). Furthermore, the 2015 *Programme for International Student Assessment* (PISA) survey includes a measure of collaborative problem solving (OECD 2013b).

Student wellbeing and engagement

Student wellbeing is 'a sustainable state of positive mood and attitude, resilience, and satisfaction with self, relationships and experiences at school' (ACU and Erebus International 2008, p. 24). Student engagement (demonstrated through students' participation in education, their sense of connectedness and their investment in learning) is

a related concept, and is often characterised as a consequence or indicator of student wellbeing (for example, ACU and Erebus International 2008; ARACY 2014; VicDET 2014a). While the focus of this section is primarily on wellbeing, it is recognised that there are close ties with engagement. Student wellbeing can be seen as both an influence on education outcomes and as an outcome in its own right.

As an outcome, student wellbeing is an increasingly important objective for schools. ‘The Australian Government recognises that schools play a vital role in promoting the social and emotional development and wellbeing of young Australians’ (DET 2016g). The importance of wellbeing is also acknowledged in education policy documents such as the *Melbourne Declaration* (MCEETYA 2008). Some state government education departments have wellbeing or engagement frameworks and policies that recognise the crucial part that schools play in developing student wellbeing and engagement, for instance, through learning experiences and fostering relationships (for example, NSWDEC 2015; QldDET 2015a; VicDET 2014b).

As an influence, evidence suggests that student wellbeing is linked to education and other life outcomes. Promoting wellbeing can improve achievement by increasing student engagement, motivation and attendance, as well as decreasing problem behaviours that lead to suspension and exclusion from school and learning opportunities (ACU and Erebus International 2008). Overall, students with high levels of wellbeing are more likely to have higher academic achievement and complete Year 12, as well as better mental health and a more pro-social lifestyle (one characterised, for example, by respect, care and concern for others) (ACU and Erebus International 2008).

In Australia, a few measures are already being used to assess wellbeing. For example:

- as outlined in appendix C (table C.4), some states conduct surveys relating to student wellbeing and engagement. South Australia, for example, uses the *Middle Years Development Instrument* — a test that has also been used internationally (SADECD 2016a)
- the Australian Council for Educational Research offers a *Social–Emotional Wellbeing Survey* to schools (ACER 2016c)
- the *Strengths and Difficulties Questionnaire* is a short behavioural screening questionnaire for 3 to 16 year olds, originally developed by child psychiatrist Robert Goodman and available online (Youth In Mind 2012). This measure has been used widely — in longitudinal studies, jurisdictional health surveys and internationally (AIHW 2012)
- at a national level, the *Australian Child Wellbeing Project* includes a nationally representative survey of wellbeing among children aged 8 to 14 years (ACWP 2016)
- also at a national level, *The Nest*, a national plan for child and youth wellbeing, refers to a framework of indicators that capture different aspects of wellbeing (ARACY 2013, 2014).

In an analysis of potential indicators for social and emotional wellbeing, the Australian Institute of Health and Welfare (2012) suggested an indicator be based on the *Strengths and Difficulties Questionnaire*. Some of its main advantages were that it: is developmentally appropriate; has been extensively validated; measures both positive and negative attributes; is used worldwide; has been used in Australia as a population measure; and is short to administer and readily incorporated into broader surveys. This measure was recently used to report on the wellbeing of children as part of the *Children's Headline Indicators* (AIHW 2016a, sub. DR128). However, the Australian Research Alliance for Children and Youth (sub. DR116) noted that this assessment tool only captures the mental health aspect of wellbeing.

In addition to the established measures of wellbeing listed above, there is another initiative in progress to measure student wellbeing and engagement across Australia:

... ACARA is working with states and territories and other stakeholders to better measure student wellbeing and engagement because of their dual role as both an enhancer of student learning and a key outcome of schooling. (ACARA, sub. 62, p. 3)

Summary

Overall, there is wide consensus and evidence in support of broadening the scope of national testing to include non-cognitive capabilities and 21st century skills, as well as student wellbeing and engagement. This would support monitoring of these outcomes and evaluation of school programs and practices in developing these skills.

As mentioned, some measures of these broader outcomes are already in place and there is work in progress to better measure these outcomes in Australia. According to the Mitchell Institute (trans.), some well-developed measures of student wellbeing are already available, whereas comprehensive measures of non-cognitive skills require further development. Given the breadth of skills and capabilities that could be measured, and the range of possible indicators, there needs to be careful consideration of which outcomes are most appropriate to measure, and the methods of measurement, for young Australians.

Steps are in train to improve information about students with disability

It is important for decision makers to consider how policies and practices can best support students with disability in their participation in and outcomes from education. The Australian Government recognises the need to 'ensure that students with disability can access and participate in education on the same basis as other students' (DET 2016c).

However, there are two key issues relating to gaps in data about students with disability, which limit the information available to decision makers. One concerns the fact that not all students with disability participate in national assessments. A second issue is that students with disability cannot be identified in national level data on education outcomes, and where state and territory data exist, there are issues with comparability.

These issues have implications for the capacity to conduct informed decision making and to improve outcomes for students with disability. For example, as the Australian Association of Special Education (sub. 30, pp. 1–3) observed:

[There is a] need for data collection to provide accountability and transparency around educational outcomes for students with disability who do not participate in NAPLAN ... The lack of outcome data means that although schools are making adjustments, there is no way of judging the general effectiveness of these adjustments, or knowing whether additional targeted funding and supports for students with disability are effective.

A review of data, evidence and practice for students with disability by the Australian Research Alliance for Children and Youth concluded that:

The inconsistent assessment of students with disability means the outcomes for these students are unknown and are not included in the decision making regarding national and state testing and subsequent planning that takes place around this testing. (Forlin et al. 2013, p. 28)

Recent initiatives should improve information about students with disability and help to address the aforementioned issues.

NAPLAN Online should help accommodate more students in national assessment

Evidence suggests that students with disability are underrepresented in national assessments. It has been estimated that more than a third of children with special needs do not participate in NAPLAN (Dempsey and Davies 2013). Children and Young People with Disability Australia (sub. 66, p. 6) stated that it ‘frequently hears of students with disability being excluded from NAPLAN testing, often at the request of schools or because no additional support was provided to allow students to participate’.

There are some adjustments to NAPLAN available to students with special needs, such as extra time or the use of a scribe (ACARA 2016b, 2016d), but the use of these approaches can be inconsistent across schools (Urbis 2015). In general, this approach of special arrangements and accommodations for students with disability is also taken by other countries in their national assessments (Pepper 2007).

The move to *NAPLAN Online* from 2017 might address some of the issues of assessment. For example, alternative test displays could be provided to students with vision impairments. (That said, because of the diversity of students with disability, *NAPLAN Online* may not be able to accommodate the requirements of all students.) ‘Tailored testing’ will also allow test questions to adapt to individual student ability, which should result in better assessment and more precise results (ACARA 2016f, 2016h).

Recent initiatives should help improve data on students with disability

Each state and territory has different approaches to assessment and reporting for students with disability (Forlin et al. 2013). A more consistent approach to assessing students with disability would facilitate monitoring of outcomes, and planning and accountability of governments and school systems.

The newly introduced initiative on the *Nationally Consistent Collection of Data on School Students with Disability* (NCCD) might help to address this issue. This initiative collects information on the number of students with disability, their location and the broad level of adjustment (such as ramps, adapting class lessons and extra tuition) provided to help them participate in education (DET 2016i; Education Council 2016a, 2016b; appendix C). A NSW report on supporting students with disability indicated that the NCCD may help schools with monitoring progress and responding to students' needs:

Almost all teachers we spoke to felt [the NCCD] would aid schools to improve how they respond to students' needs and monitor their progress. For a student to be included in the data collection, the school must have evidence of:

- adjustments being provided to the student based on their needs
- ongoing monitoring and review of the adjustments
- consultation with the student and/or parents and carers. (Audit Office of New South Wales 2016, p. 27)

The Australian Government Department of Education and Training (sub. DR143, p. 5) said:

While the NCCD does not provide information on education outcomes, it is expected that the data collection will become part of a continuous process for supporting students with disability to fully access and participate in education.

Although the NCCD does not assess outcomes, linking these data to data on education outcomes (such as NAPLAN) could provide some indication of how students with disability are performing at a national level. However, this would require identifying information to be collected — currently, 'only de-identified school level data on students with disability [are] submitted to education authorities' for the NCCD (Education Council 2016b, p. 2). As noted in box 3.1, there are also issues with the current quality of this data collection that could affect its reliability. Linking outcomes data with data on student disability available in state and territory collections (appendix C) is another option that could shed light on education outcomes for students with disability at a state and territory level, but comparisons would be difficult due to inconsistencies in these data between these jurisdictions.

Longitudinal data on the education experiences of children and young people are needed

Longitudinal data allow decision makers to go further than identifying and describing a policy problem (as is possible with cross-sectional data) to a greater understanding of how and why problems occur, the consequences, and potential solutions (FaHCSIA 2013). In the context of education, longitudinal data on children are important for understanding pathways through education, analysing long-term outcomes associated with these pathways, and facilitating the evaluation of policies and programs. Longitudinal data can be used to generate evidence to fill gaps in the education evidence base, for example, relating to value-added measures of education outcomes and the impacts of ECEC (section 3.4). Longitudinal data that extend beyond early childhood and school education, to tertiary education and workforce participation, can provide further insights into the effectiveness of the education system (Mitchell Institute, sub. DR103).

There are a few options for creating a longitudinal dataset. One involves matching administrative records from the same individual over time through data linkage. This uses existing data to understand longitudinal pathways and outcomes. However, the use of administrative data as a sole data source limits the issues that researchers can investigate to those involving information collected for administrative purposes. Issues with the quality of administrative data (section 3.2) can also affect the reliability of the evidence generated.

Another option for creating longitudinal data is to conduct a longitudinal survey that follows a cohort of children over time. These studies have the benefit of being able to include survey questions that cover more detailed aspects of the lives of children and young people, as well as additional assessments, which may not be reflected in administrative data. This enables a broader range of research problems to be analysed. However, surveys entail financial and compliance costs over and above those usually associated with data collected through routine administrative activities.

The use of linked administrative data and longitudinal surveys combines the benefits of both of the above options. Longitudinal survey data can be used to gain a nuanced understanding of education for children and young people. Linking these data with administrative data can reduce costs, for example, by reducing the number of questions about demographic characteristics (Edwards and Siphthorp, sub. 73). Linking data collections within and outside of the education sector can also provide valuable information on a broad range of influences and outcomes. However, there are currently some barriers to access to and linkage of administrative data, as discussed in chapters 5 and 6.

There are a few key longitudinal surveys of children and young people in Australia. The following section discusses how these surveys could be improved.

Longitudinal studies of Australian children and young people

The *Longitudinal Study of Australian Children* (LSAC) and *Longitudinal Study of Indigenous Children* (LSIC) collect data that support analysis of the effects of children's economic, social and policy environments on their development and wellbeing over time from birth or preschool age. The *Longitudinal Survey of Australian Youth* (LSAY) collects data on young Australians from the age of 15, and supports analysis of the pathways from school to further study, work and other pursuits. Further details of these surveys are presented in appendix C.

Given changes in economic and social conditions, and recent changes in ECEC settings — for example, the creation of the *National Quality Framework* (NQF) in 2012 — many inquiry participants noted the potential benefits of new cohorts of LSAC and LSIC. For example, the Australian Children's Education and Care Quality Authority (ACECQA, sub. 11, p. 8) stated:

Australia's major national birth cohort studies, [LSAC and LSIC] commenced in 2004 and 2008 respectively. Although both studies have relatively large (and, in the case of LSAC, nationally representative) samples, they were established before the creation of the NQF.

These surveys are consequently limited in the insights they can provide into the current early childhood education policy context and the NQF's contribution to positive outcomes for children and communities.

Many participants displayed support for new longitudinal cohorts in post-draft report submissions as well (for example, AARE, sub. DR114; CIS, sub. DR126; Goodstart Early Learning, sub. DR135; Mitchell Institute, sub. DR103; NCEC, sub. DR106; Queensland Government, sub. DR142; QUT Faculty of Education, sub. DR101).

New longitudinal cohorts could provide significant benefits to researchers and policy makers, particularly if there are investments in data linkage at the outset of the survey (Edwards and Siphthorp, sub. 73). For example, while it is well established that the quality of ECEC services plays an important role in child development, there is a lack of evidence on the contribution of different aspects of quality to child development (AIHW 2015b; PC 2014a). Longitudinal survey data on children who were exposed to ECEC services after the NQF was implemented, together with ECEC quality data (captured by the National Quality Agenda IT System), would allow researchers to address some of the questions on how ECEC affects children's outcomes.

Furthermore, much has been learned about the collection of longitudinal survey data since LSAC and LSIC commenced. For example, the approach to data cleaning in LSAC has improved as the study has developed (AIFS 2015b). There have also been new data items included since the survey's inception (ACECQA, sub. 11). Developments in linkage with administrative data from education and health sectors are another key way in which LSAC data have been strengthened over time (Edwards and Siphthorp, sub. 73).

Current weaknesses of LSIC include its lack of representativeness of all Indigenous children, relatively small sample size and lack of comparability with questions asked in LSAC and other surveys. That said, some of these issues have arisen through the intentional design of the survey, in order to be sensitive to cultural issues (Dodson, Hunter and McKay 2012). While LSAC is representative of the population, the sample size does not enable robust analysis of some subpopulations of interest, such as Indigenous children and those from disadvantaged families (for example, ACECQA, sub. 11).

Application of the aforementioned learnings, and steps to address any weaknesses, would strengthen the value of any new longitudinal cohort. For example, to address the issue of difficulties in performing robust and representative analysis of key issues relating specifically to Indigenous and disadvantaged groups, new cohorts of LSAC could include a greater number of Indigenous children and children from other disadvantaged groups.

It is also important to consider the costs of new cohorts of LSAC and LSIC. The Australian Government (through the then Department of Family and Community Services) allocated \$20.2 million over nine years from 2000 for LSAC (AIFS 2002) and \$17.4 million over eight years from 2003 for LSIC (DSS 2015a; Treasury 2003, 2007). Ongoing funding has since been provided to maintain both studies. Taking into account their initial sample sizes (nearly 1700 children in LSIC compared with 10 000 in LSAC across both birth and preschool cohorts), LSIC has larger financial costs than LSAC. Additional costs of LSIC are associated with liaising with Indigenous communities and building research capabilities of Indigenous interviewers (Dodson, Hunter and McKay 2012).

The financial cost of new cohorts would depend on study details including sample sizes and the degree to which data linkage could be used to reduce the number of survey questions. As sample studies, the compliance costs of participating fall on a relatively small number of families and participation is voluntary.

Overall, the benefits to education decision makers of a new and improved cohort of LSAC (that uses opportunities for data linkage, draws on lessons from existing studies and improves on the current LSAC, for example by incorporating a larger number of Indigenous children) are likely to outweigh the costs. Introducing mechanisms to establish new cohorts regularly after a set number of years would facilitate research in a changing policy landscape. An updated cohort of LSAC may be able to provide the data required to investigate issues associated with the education experiences of Indigenous children in a more cost-efficient way than a new cohort of LSIC. The marginal benefits of introducing a new cohort of LSIC should be considered in comparison to how well an updated cohort of LSAC could be used to provide insights into the experiences and outcomes of Indigenous children.

While new cohorts of LSAY are already established periodically, with six cohorts since its inception in 1995 (appendix C), LSAY could also benefit from greater data linkage. The National Centre for Vocational Education Research and the Australian Institute of Family Studies have been working together to scope potential data linkages for the 2015 LSAY cohort (NCVER, sub. 65). General barriers to data linkage are discussed in detail in chapter 6. Increasing the number of young Australians from disadvantaged groups in future

cohorts of LSAY would also support more granular analysis of particular groups, such as Indigenous Australians, young people from low socioeconomic backgrounds, and those living in remote areas (NCVER, sub. 65).

RECOMMENDATION 3.2

The Australian Government should request and sufficiently fund the agencies that conduct the *Longitudinal Study of Australian Children* to establish new cohorts at regular intervals. The agencies should use opportunities to link with administrative data and draw on the experience gained from use of the original study.

Steps are in train to develop data on the education workforce

A number of inquiry participants pointed to a need for better national data on the education workforce (for example, AITSL, sub. 5; ECA, sub. 71, sub. DR134; Mitchell Institute, sub. 31; Monash University, sub. DR122). The need to improve workforce data was also expressed in the Teacher Education Ministerial Advisory Group's report on initial teacher education (TEMAG 2014).

One motivation for improving data on the education workforce is to support workforce planning. Existing data collections on the teacher workforce have been found to be inconsistent and lacking in detail on subject specialisations, which has resulted in difficulties for initial teacher education providers and employers to match supply and demand (DET 2016i; appendix C).

There is also a case for improving workforce data in order to better assess the impacts of initial teacher education on classroom readiness and student outcomes (TEMAG 2014). As the Mitchell Institute (sub. 31, p. 23) stated:

Strengthening initial teacher education data would provide highly relevant and useful data for understanding the relative success of initial teacher education programs and early career mentoring strategies, as well as enabling assessment of initiatives intended to improve them.

The ability to link workforce data to other data, such as student and school outcomes, would facilitate analysis of these issues. Data linkage issues are discussed further in chapter 6.

Recent initiatives have aimed to improve education workforce data. The triennial *National ECEC Workforce Census* has collected data on ECEC staff and service providers since 2010 (DET 2016a; appendix C). Some participants argued that this data collection should be developed to address data quality concerns of comprehensiveness (for example, ECA, sub. 71, sub. DR134). In school education, the Australian Government contracted Ernst & Young in 2011 to develop a *National Teaching Workforce Dataset*, which included data on teachers' backgrounds, teacher registration and current employment (DET 2014b). Despite this work, an ongoing collection was not established. However, the Australian

Institute of Teaching and School Leadership is working on a national minimum dataset that will provide more comprehensive and continuous data on teachers (box 3.5).

Box 3.5 **A national minimum dataset for the teacher workforce**

In 2014, the Australian Government asked the Australian Institute of Teaching and School Leadership (AITSL) (in collaboration with states and territories and their regulatory authorities) to coordinate an approach to workforce data collection, following the development of a workforce research agenda (AITSL 2015c). Currently, workforce data collected include census data on initial teacher education (*Higher Education Statistics Collection*), and survey data on teacher destination, course experience, career and retirement intentions, and current teacher shortages (*Australian Graduate Survey* and *Staff in Australia's Schools Survey*). The dataset proposed by AITSL aims to provide a more comprehensive collection. It will include a teacher identifier and contain information pertaining to:

- initial teacher education — teacher background, prior academic achievement and initial teacher education program details
- teachers — demographic information
- registration — year, status and restrictions
- employment — status, load, place of employment
- teaching — perceptions of initial teacher education program, employer perception of teacher classroom readiness, subject level taught, professional development and career intentions (AITSL, sub. 5).

FINDING 3.1

There are gaps in existing data collections, but ongoing initiatives should help to fill many of them.

- The Australian Government's proposal for a national Year 1 assessment should help to better assess performance of early school skills and to identify students who need early intervention on a nationally consistent basis.
- Work by the Australian Curriculum, Assessment and Reporting Authority, the Victorian Curriculum and Assessment Authority and relevant research institutes should help to improve methods and metrics for measuring non-cognitive outcomes and wellbeing.
- The *Nationally Consistent Collection of Data on School Students with Disability* should help teachers and education systems to better support students with disability.
- The development of a national minimum teacher dataset by the Australian Institute for Teaching and School Leadership should help to support workforce planning and assessment of initial teacher education.

Additional data on external influences should be collected where warranted

As discussed in chapter 2, the education outcomes of children and young people are affected by influences that are external to the education system.³ Studies of student achievement suggest that these influences make a larger contribution to students' outcomes than do school factors (Emerson et al. 2012). It is therefore important to take them into account when evaluating the effects of education policies, programs and practices on education outcomes. If data on these influences are not available, valuable insights about how the effects of an initiative vary for different groups of children and young people (for example, between those from more and less advantaged backgrounds) could be missed. There is also the risk that estimates of the relationship between an initiative and an outcome could be biased.

From the perspective of an education provider, knowledge of a student's characteristics might be important to understanding and supporting them. For example, it might assist educators in tailoring their teaching to the individual needs of students or identifying students who might be vulnerable so that specific interventions can be targeted towards them.

Basic background information is collected within education datasets, and information on some other external influences is available within health and other datasets (appendix C). These data could be linked to support research, teaching practices and the targeting of interventions. For example, the families of children who are not attending ECEC are often experiencing socioeconomic disadvantage (United Voice, sub. 42). Supporting them in accessing targeted ECEC programs could have substantial benefits, especially if the children are vulnerable to poorer education outcomes (discussed above). The Mitchell Institute (sub. 31) suggested that the detection of these families and children could be facilitated by linking ECEC enrolment data to data from the health sector or the Australian Government Department of Human Services. (Data linkage is discussed further in chapter 6.)

Participants have indicated that data on other external influences that could be important to education outcomes, particularly relating to parents, are not collected to a sufficient degree in any Australian dataset. For example, the Telethon Kids Institute (sub. 15, p. 3) noted that '[t]he quality of the home environment is the most important factor in a child's social and intellectual development ... Australia has no measure on the quality of parenting or family cohesion'. The Queensland University of Technology Faculty of Education (sub. 19, p. 11) indicated that further data are required on 'the degree of parental engagement with their child throughout their school years; parents' perceptions of the value of education and where they think academic excellence comes from ...'. The National Centre for Vocational Education Research (sub. 65, p. 6) indicated that 'information about parental support and attitudes

³ Some participants claimed that not all influences external to the education system are beyond the control of education providers — particularly parental engagement (APC, sub. DR133; CSPA, sub. DR130). Initiatives within education institutions that promote parental engagement can help to support student learning, as discussed in section 3.4.

towards education and work is extremely limited' in LSAY. Box 3.6 describes some of the existing evidence and data gaps in parental engagement.

Box 3.6 Evidence and data on parental engagement

Many participants to the inquiry contended that parental engagement has an important influence on student outcomes (APC, sub. DR133; ARACY, sub. DR116; CSPA, sub. DR130). This view is supported by research evidence. For example, studies using international data have found that parental engagement in the early years of children's development through parent-child reading activities has positive effects on children's cognitive skills such as reading, language and comprehension (Gest et al. 2004; OECD 2012a; Westerlund and Lagerberg 2008). A study using linked LSAC and NAPLAN data found that children aged 2–3 who had more stimulating home learning environments (particularly the frequency of reading to children and the number of children's books) perform better in Year 3 reading and numeracy tests than those who had less stimulating home learning environments (Yu and Daraganova 2014). Research using linked ABS and Tasmanian Government data also showed that parental engagement has a strong relationship with early childhood development (ABS 2016a).

A recent project commissioned by the Australian Research Alliance for Children and Youth analysed existing data collections that include measures of parental engagement. An audit of 19 large-scale surveys (state, territory, national and international) that capture data on parental engagement found that there were some gaps in existing collections. For example, few surveys collected information on parental engagement before the middle years of primary school, and some aspects of parental engagement and information on Indigenous or culturally and linguistically diverse populations were not well covered (ARACY forthcoming).

There is merit in collecting additional data on external influences to:

- analyse the interactions between external influences and education outcomes
- control for external influences in evaluative research
- investigate the effectiveness of education initiatives designed to promote positive external influences on education outcomes (such as parental engagement).

However, these data do not have to be collected on all Australian students in order to produce valid results. Instead, data on external influences that are considered to be most relevant could be collected on a case-by-case and fit for purpose basis. The information could be collected for a representative sample rather than for all students. For example, PISA survey data currently include a range of external influences, including parental education and occupation, family wealth, parental engagement and home educational resources (OECD 2016). These data have been valuable in examining the association between external influences and education outcomes for school students (for example, Lokan, Greenwood and Cresswell 2008).

On the other hand, collection of data on all Australian students could be useful if the intention is to detect individual students who may be adversely affected by particular external influences. Schools and teachers might want to identify these students to inform

their planning and direct where education interventions should be targeted. However, research evidence generally suggests that the type of external influence included in research that makes the largest contribution to student outcomes is socioeconomic status (for example, Lamb et al. 2004; Lokan, Greenwood and Cresswell 2008; Nous Group 2011). Schools already collect socioeconomic information (notwithstanding quality issues). Although other external influences have also been associated with education outcomes, their contributions to variation in education outcomes tends to be smaller.

3.4 Gaps in education evidence

Notwithstanding the large body of education research that currently exists, three broad areas of Australian education evidence could be strengthened — evidence on how ECEC affects education outcomes; the use of value-added approaches to measuring education outcomes; and the evaluation of what works best in education settings to improve outcomes.

Evidence on early childhood education and care

There is a large body of international evidence on the benefits of quality ECEC for children and the nation as a whole. As the OECD (2012b, p. 9) noted:

A growing body of research recognises that [ECEC] brings a wide range of benefits, for example, better child well-being and learning outcomes as a foundation for lifelong learning; more equitable child outcomes and reduction of poverty; increased intergenerational social mobility; more female labour market participation; increased fertility rates; and better social and economic development for the society at large.

Notwithstanding the international research, there is limited evidence on how ECEC contributes to education outcomes in the Australian context (Harrison et al. 2011). Multiple inquiry participants (for example, ACECQA, sub. 11; Biddle and Breunig, sub. 25; CIS, sub. DR126; CCC NSW, sub. 51; Mitchell Institute, sub. 31; RIPPLE, sub. 45) and reports (for example, AIHW 2015b; PC 2014a) have indicated that there is scope to enhance Australia's education evidence base in the area of ECEC. This was particularly with respect to:

- the contributions to children's development outcomes of ECEC quality components (such as the physical classroom environment, programs and practices, staff qualifications and staff to child ratios)
- how the outcomes of students in their early years of schooling are affected by ECEC attendance (such as the number of hours of ECEC that children receive and the age at which they begin attending ECEC) as well as the long-term effects of ECEC attendance on life outcomes
- how ECEC programs benefit different groups of children and families, particularly Indigenous children and disadvantaged children.

In part, gaps in evidence about these issues reflect a lack of rigorous trials and evaluation of ECEC programs and interventions — discussed below in the context of what works best and in chapter 7. But they also reflect a lack of exploratory research on the associations between characteristics of ECEC and children’s outcomes.

There is a strong case for including ECEC data within a national education evidence base to both investigate the above issues to inform policy and practice and to include it as a contextual factor in research on education outcomes of school students. Improvements in data quality and content (discussed above) and access and linkage (discussed in chapters 5 and 6) would help researchers to address this gap.

Previous research by the Commission pointed to the potential benefits of linked data to the development of ECEC evidence (PC 2014a). The Commission found that:

The Australian Government should establish a program to link information for each child from the National ECEC Collection to information from the Child Care Management System, the Australian Early Development Census, and NAPLAN testing results to establish a longitudinal database. Where possible, this should also be linked to other key administration data sets and Censuses. (PC 2014a, p. 714)

There are initiatives underway to address the gap in ECEC evidence. For example, the ABS has recently made progress in linking some ECEC data collections — in particular, data from the 2015 AEDC, the 2013 and 2014 *National ECEC Collection*, and service quality data relating to the NQF (ABS, sub. DR105; appendix C). This work has been undertaken with strong support from Australian and state and territory government education departments. The linked dataset contains information about early development outcomes, preschool enrolment and attendance, and the quality of ECEC providers. The ABS (sub. DR105, p. 2) commented on the value of this dataset, stating that:

Key education stakeholders are reviewing the de-identified dataset in the secure ABS DataLab prior to considering making the dataset more widely available. It is anticipated that, with agreement of the various data custodians, other datasets could be added to further enhance the value of this dataset. The dataset has already been used heavily to assist in understanding the relationships between early childhood education programme enrolment and attendance and vulnerability as measured by the AEDC.

The Australian Institute of Health and Welfare also has a project to develop a *National Early Childhood Development Researchable Data Set* by linking health and education datasets together (appendix C). It aims to provide data on all children to enable robust analyses of outcomes for population subgroups and analysis of the impacts of policies and programs (AIHW 2014a). The project has experienced a number of challenges relating to data access (AIHW 2014a). It is currently on hold as the Australian Institute of Health and Welfare awaits ‘further resources from the Australian Government to gain approval to procure and link data’ (AIHW, sub. 55, p. 4).

These data linkage projects would help provide data to fill gaps in evidence on ECEC, and should continue to be supported. Proposed reforms to privacy laws (chapter 5) would also

unlock access to datasets such as the *Child Care Management System*, which is held by the Australian Government. Access to these datasets would further support research and analysis on ECEC issues, and hence facilitate the creation of evidence.

Value-added measures of education outcomes

There is also a case for a greater focus on value-added measures of education outcomes in the education evidence base. Absolute levels of achievement, as indicated by average NAPLAN scores for example, do not provide a full picture of the impact that schools have on student learning. Value-added measures take into account two additional aspects of student achievement: growth over time and external influences that schools have little direct control over. That is, value-added analysis focuses on the value that a school has added to the learning of a student, over and above that expected given the backgrounds and prior levels of achievement of students within the school (CESE 2014a; Doran 2003; Downes and Vindurampulle 2007). It is considered a more appropriate method for measuring the efficiency, effectiveness and value for money of the education system (E3 and SEMETRICA, sub. 17). This approach ‘creates a fairer system for comparing school performance that is not biased against schools serving more disadvantaged communities’ (Grattan Institute, sub. 61, p. 10).

Value-added measures have been examined to an extent in education (for example, CESE 2014a), but they are ‘still in infant stages of use in Australia’ (Grattan Institute, sub. 61, p. 12). Grattan Institute (sub. 61, p. 6) indicated that:

While larger state departments are well positioned to undertake this function for government schools, there could be gains from doing it at a national scale and across all three sectors.

Although the use of value-added approaches cannot answer why some schools add more value than others, they are a useful starting point for further analysis of high-performing schools to shed light on school effectiveness and understand what works to improve education outcomes (CESE 2014a). In particular:

[The] results can inform how well school improvement strategies are working, and highlight possible areas for learning, future planning or further research. They can also provide low [value-adding] schools with learning opportunities by enabling investigation of the factors that contribute to higher [value-added] scores in schools with similar student and school characteristics. (CESE 2014a, p. 5)

The NSW Centre for Education Statistics and Evaluation used this approach to identify 37 high-performing schools and found a number of factors associated with their strong performance, including effective teacher collaboration, use of explicit teaching strategies, promotion of student engagement and high expectations (CESE 2015a).

The use of value-added measures was broadly supported by participants (for example, ASPA, sub. DR119; Fraser Mustard Centre, sub. DR112; ISCA, sub. DR138; Telethon Kids Institute, sub. DR129; UTas Faculty of Education, sub. DR90). However, some noted that

care should be taken in their use. Reasons for this included a tendency for value-added measures to be unreliable and prone to error (QUT Faculty of Education, sub. DR101; Deakin University School of Education, sub. DR136) and reservations about whether they could provide clear evidence about which strategies used by high-performing schools led to their outperformance (Fraser Mustard Centre, sub. DR112).

There were also concerns about the potential for value-added measures to be misused as a teacher accountability measure, as they have been in the United States (Deakin University School of Education, sub. DR136). The American Educational Research Association (2015, p. 449) commented on the issue, stating that:

Although VAM [value-added models] may be superior to status models, it does not mean that they are ready for use in educator or program evaluation. There are potentially serious negative consequences ... that can result from the use of VAM based on incomplete or flawed data, as well as from the misinterpretation or misuse of the VAM results. Teachers and leaders, for example, with low VAM scores can experience loss of advancement, lost compensation, and even termination. Also, when large numbers of teachers and leaders are misidentified, then resources may be misdirected, and the educational system as a whole can be degraded.

Some also viewed that basing value-added measures on existing standardised tests of literacy and numeracy provides a limited picture of growth, and that the measures should include outcomes from the non-cognitive domain (Good Shepherd, sub. DR118; SLRC, sub. DR93; UTas Faculty of Education, sub. DR90).

Many of the concerns about value-added measures can be addressed. The use of value-added approaches in Australia is still in its early stages, and improvements in data and methodology and the further development of techniques could help to meet quality concerns. Value-added measures should not be used for teacher accountability in Australia, but rather as a basis for shedding light on what works best in education settings. The Commission also supports the view that value-added measures could be used for non-cognitive outcomes as data on these outcomes become available. Overall, value-added measures make an important contribution to the evidence base and should be supported.

Fundamental to performing value-added analysis is the availability of longitudinal data on student education outcomes and external influences. Some of these data could be made available by linking datasets, including those outside the education sector. While a unique student identifier may not be necessary for data linkage (chapter 6), it could support the tracking of students across the education system, enabling data on their education outcomes and external influences to follow them over time (chapter 4). Care is necessary to ensure that the personal information of students is protected. Privacy and data linkage issues are discussed further in chapters 5 and 6.

RECOMMENDATION 3.3

Australian, state and territory governments should support greater use of value-added measures of education outcomes.

Evidence on what works best, for whom and in what circumstances

There is a growing realisation that a different approach to improving education outcomes is required. Reform effort has not led to improvement in education outcomes (chapter 1), and a top-down approach based on monitoring and benchmarking performance has proven insufficient to drive improvements in education outcomes (chapter 2).

Evidence suggests that looking within education institutions can be more effective at providing insights into what works best to improve education outcomes. Research has generally found that only a small share (typically about 20 per cent) of variation in education outcomes is explained by differences between schools. The majority (about 80 per cent) is explained by differences within schools (for example, Gemici, Lim and Karmel 2013; Lokan, Greenwood and Cresswell 2008; Nous Group 2011; PC 2016b).⁴ These differences within schools include differences in teachers and teaching practices, as well as differences in the characteristics of students and their families, to the extent that there is variation in these influences within the school.

Hattie (2003) has suggested that teachers have the greatest impact on student performance outside of students' own characteristics, and that directing attention to higher-quality teaching can have large positive effects on outcomes across the board. Research has shown that there is large variation in teacher effectiveness within schools (Hanushek 2016).

The idea of directing the focus of education policy to teachers and teaching practices is not new. OECD reports have highlighted the need for evaluation and assessment frameworks for school improvement to incorporate an emphasis on engaging teachers and improving classroom practice (OECD 2011, 2013c). In Australia, a national collaborative project between jurisdictions on school performance improvement frameworks indicated that building teacher and principal capability, and use of data in schools and in the classroom, were some of the factors important to school improvement (DEEWR 2010). In terms of ECEC, the key role of staff in child development and learning has been noted by the OECD (2012b) but, as mentioned, more evidence is needed in the Australian context.

The characteristics of students' families, including how actively parents engage in their child's education, are another important consideration. For example, schools can promote parental engagement through partnerships and communication (DEEWR 2008; Emerson et

⁴ Differences between schools reflect influences that are the same across all students within a school. Differences within schools reflect influences that differ between students within a school.

al. 2012; APC, sub. DR133). Current government-funded initiatives recognise the important role of parental engagement. For instance, both the Australian Research Alliance for Children and Youth (ndb, sub. DR116) and Catholic School Parents Australia (sub. DR130) are undertaking projects to better understand and improve parental engagement.

Overall, the evidence indicates that a bottom-up approach that looks at what works best, for whom and under what circumstances within education settings is necessary to drive improvements in education outcomes.

There is a need to improve the creation of high-quality evidence on what works best to improve education outcomes in Australia. Although high-quality education research is conducted within governments and research institutions (AARE, sub. 22; SLRC, sub. DR93; SVA, sub. DR98), multiple inquiry participants highlighted gaps in the Australian evidence on the effectiveness of education practices, programs and policies (box 3.7). As discussed in chapter 7, more could be done to support the creation of evidence on what works best. This could involve implementing a policy direction and research infrastructure for the creation of evidence relevant to decision makers, and building capacity to use data and create evidence.

Box 3.7 Participants' views on gaps in evidence on what works best

Fraser Mustard Centre (sub. 52, p. 2):

... [there is] a continued dearth of evidence about what makes a difference to children's educational, health, and wellbeing outcomes.

Social Ventures Australia (sub. 59, p. 17):

There is a lack of high quality evidence of the actual learning impact of approaches and programs in schools.

Research Institute for Professional Practice, Learning and Education, Charles Sturt University (sub. 45, p. 2):

... there is still only a relatively limited Australian evidence-base to inform policy decision-making. As a consequence, there has been a strong reliance on international evidence that is often dated, or not directly transferable to the Australian context.

Deakin University School of Education (sub. DR136, p. 2):

... there is a need to focus on bottom up practice as a way of investigating the impact of policies, programs and practices in the complex environment of schools and classrooms ...

Queensland Government (sub. DR142, p. 12):

Bottom-up evidence about what works, where and for whom, is a critical enabler to driving student and early childhood improvements.

Australian Secondary Principals Association (sub. DR119, p. 4):

Whilst we agree that there [are] gaps in ... evaluation of policies, programs and teaching practices to identify what works best, for whom and in what circumstances 10000 different schools across Australia present 10000 different challenges.

The existence of evidence on what practices, programs and policies work best is necessary but not sufficient to improve outcomes. Another key area involves meeting the needs of decision makers in implementing education evidence (section 3.5).

3.5 Gaps in the use of education evidence

Although there are some gaps in data, and some more significant gaps in evidence, the biggest gap lies in the use of education evidence — that is, how evidence is translated, communicated and implemented by decision makers. Addressing this gap may require, for example, an emphasis on effective translation of the evidence into practical material for teachers, greater efforts to communicate research findings to education decision makers, creating a strong culture of research use among decision makers, and research into how the use of evidence can best be effected (chapter 7). Multiple participants acknowledged that there were gaps in the implementation of evidence by education decision makers in Australia (box 3.8).

To fill gaps in the evidence on what works best in education, and to encourage subsequent implementation of this evidence, there needs to be a clear policy direction that supports a bottom-up approach to education data and evidence. Education research has to be relevant to the requirements of decision makers (for example, families, educators, education providers and policy makers), and research findings must be translated and communicated in a way that is useful to them. All decision makers should be encouraged to implement evidence-based practices and policies. Further consideration of the creation and use of evidence, including ways of filling these gaps, is presented in chapter 7. An institution to support a bottom-up approach to education is proposed in chapter 8.

Box 3.8 Participants' views on gaps in the use of education evidence

Social Ventures Australia:

If a better evidence base is to lead to improved student outcomes, it is critical that communication and use of evidence is considered ... (sub. DR98, p. 11)

There is a gap in stimulating and meeting the 'demand side' of evidence use; the needs of frontline professionals who ultimately deliver the learning impact. (sub. 59, p. 17)

Speech Pathology Australia (sub. 35, p. 12):

For data to be an 'evidence base' it requires both drawing together of relevant data *AND* the use/promotion of this data in everyday practice by end users. ... It is recommended that the Commission ... consider how such data will be used to demonstrate effectiveness and efficacy of different educational interventions and then following from that, how such learnings can inform policy and planning and be translated into teaching practices in schools.

Science of Learning Research Centre (sub. DR93, p. 9):

The [Science of Learning Research Centre] ... agrees strongly with the need for research findings to be disseminated and to be accessible by end users including education professionals, policy makers, parents and the wider community.

Queensland Government (sub. DR142, p. 3):

... Queensland agrees there is a rationale for improving the national education evidence base, using both the top-down and bottom-up approaches outlined in the draft report and focusing strongly on the application of data and translation of research to inform good practice.

STEM Education Research Centre (sub. DR123, p. 4):

Research into how (and if) practitioners translate research findings and training into changed classroom practice is a relatively young field in education research. ... Research on scaling and sustaining educational innovation is also in its infancy, but already a good deal is known.

Australian Research Alliance for Children and Youth (sub. DR116, p. 14):

We draw the Commission's attention to the extensive literature on social, cultural and institutional barriers to use of evidence in medical practice (and some in education practice). These studies provide ample cases where evidence has been clear, unambiguous and totally ignored. ... There is unfortunately less empirical evidence on barriers to use of evidence in Australia.

FINDING 3.2

The two largest gaps in the national education evidence base are evidence about:

- the impact of policies, programs and education practices in Australian schools and early childhood education and care services
- the most effective implementation strategies for turning best practice into common practice.

4 Data collection, processing and reporting

Key points

- Schools and early childhood education and care (ECEC) providers, and their staff, bear a significant burden collecting and processing a large volume of data to fulfil government requirements.
 - Differences in resourcing across education systems and geographic locations mean that the burden is not shared equally.
- Government reporting requirements should accommodate schools and ECEC providers with inferior access to technology, including those in remote areas with poor internet access.
- Unnecessary duplication in data collection and processing adds to the burden on schools, ECEC providers and parents.
- Smart use of technology can lower costs, reduce duplication and improve data quality, including timeliness.
 - Expanded use of information and communications technology (ICT) systems can reduce manual processing and improve information sharing within schools and ECEC providers so that data need only be entered once.
 - Implementation of interoperability standards can facilitate the exchange of data between schools, school system authorities and governments.
 - Nationally consistent unique student identifiers would offer significant operational benefits as well as providing one method of supporting education data linkage for research purposes. The costs would be minimised by allowing each jurisdiction to develop and implement its own student identification system in a nationally compatible manner. Further work is required to develop feasible ways of extending such an identifier to the ECEC sector.
- Changes to reporting requirements should be infrequent, as there are costs associated with altering systems for data collection and processing (including ICT systems) to meet new requirements.
 - Governments should allow sufficient time between the announcement of changes to reporting requirements and when they come into force, to allow schools and ECEC providers to respond without incurring excessive costs.
- Inadequate staff training in data collection and processing practices can lead to a greater burden on staff and compromise data quality. Educators and administrative staff may need additional training, including in the use of technology.
- Increasingly, technology is being harnessed to improve the accessibility and usability of data available to educators, parents and the community. This trend is welcomed by the Commission.

Compliance with government reporting requirements in the education sector involves significant costs. This burden falls on schools and ECEC providers, their staff (including educators), families and students. Resources need to be devoted to data collection and data processing tasks, and the way these tasks are carried out affects data quality (including timeliness, accuracy and consistency (discussed in chapter 2)). Compliance costs could be reduced through improvements to data collection and processing.

4.1 Data collection and processing issues

The data collection and processing burden

The data collection and processing burden on schools and ECEC providers is significant, and several stakeholders considered that the burden has been increasing over time (box 4.1). Because they are spread across a large number of data providers, these compliance costs are less readily observable than the administrative costs borne by government agencies receiving data. Data providers are also exposed to the cumulative costs from having to supply data for multiple collections.

Part of the compliance burden is borne by staff, predominantly administrative staff, but also educators. Staff must spend time carrying out data collection and processing tasks, often without a reduction in other duties. The burden of data collection and processing is thus partly hidden, as the resource opportunity costs are not wholly and transparently accounted for.

Box 4.1 Participants' views on the time burden of data collection

Australian Primary Principals Association (sub. 64, p. 1):

Gathering data 'distracts' teachers from their work. Regardless of the value in coordinating the national education evidence base, primary school principals would be deeply concerned if teachers and students were to be forced to expend additional time and energy on the data collection task. The provision of additional resources to ameliorate this expenditure would not alter the finite nature of contact time between students and teachers at school. [The Australian Primary Principals Association] believes classroom time is precious and should be devoted to learning.

School of Education and Professional Studies, Griffith University (sub. 76, p. 3):

... administration of national standardised testing, such as [the *National Assessment Plan — Literacy and Numeracy* (NAPLAN)], has significant costs, not only in terms of financial costs, but also opportunity costs for other curriculum when schools focus on NAPLAN preparation.

Independent Education Union of Australia (sub. 18, p. 4):

... the monumental growth in data collection, required by governments (invariably tied to school funding), has resulted in significant increases in workload and red-tape in schools with major work intensification issues being faced by [Independent Education Union of Australia] members as a consequence.

Independent Education Union of Australia — Queensland and Northern Territory Branch (sub. 21, p. 2):

For those who work with students in early childhood education and schools, the net effect is an ever-expanding list of tasks that are peripheral to the core business of teaching and learning and an expectation that these can be performed in the absence of any meaningful industrial provisions such as release time, access to professional development or even relevant and adequate resources.

Independent Schools Council of Australia (sub. DR138, p. 5):

... for many schools reporting is an onerous task which ties up considerable resources. Any additional collections would need to be very closely examined to ensure that they are an effective use of a school's time and that effort is made to streamline data collections to ensure that the cumulative reporting burden does not become too great.

Queensland Government (sub. DR142, p. 8):

Education departments collect a considerable amount of data required to meet reporting requirements through various National Agreements, National Partnership Agreements and Project Agreements. This presents challenges in the form of respondent burden on schools, parents, sectors and providers, and flow on impacts on the ability of schools and ECEC providers to focus efforts on their core business of education and care, and teaching and learning.

The capacity of school and ECEC providers to collect and process data is not uniform, due to resourcing differences across both sectors (box 4.2). The capacity of schools and ECEC providers to fulfil their reporting obligations depends partly on the extent to which they receive centralised administrative support, either as part of a school system (government or Catholic-systemic schools), or as part of a network of ECEC providers. In Queensland and Tasmania, for example, all government schools have access to comprehensive ICT systems — *OneSchool* and *Edi* respectively — which assist these schools to fulfil their data collection and processing requirements (section 4.2). Size matters too. Larger schools and ECEC providers with dedicated administrative staff will typically have a greater capacity than smaller education institutions.

Box 4.2 Participants' views on the uneven burden of data collection

National Catholic Education Commission:

... schools and their staff bear a significant burden collecting and processing a large volume of data to fulfil government requirements — a burden that is not shared equally across education systems and regions. (sub. DR106, p. 8)

The impact of the costs of [additional data] collections will often be greater for Catholic schools than it will be for government schools. This is, in part, because of the devolved governance arrangements of Catholic schools. Although Catholic schools devote considerable time and resources to meeting reporting requirements, they do not have the staff and resources that the government sector has at its disposal. (sub. 49, p. 8)

Independent Schools Council of Australia (sub. 39, p. 4):

Unlike other sectors, most Independent schools operate autonomously. They do not rely on central bureaucracies or system authorities and are individually accountable to their parent and school communities. This means that data requests are made directly to the schools themselves and that schools are often required to provide the requested data regardless of what internal resources they have in place.

There is great variance across Independent schools in terms of how they manage the collection of data for national and jurisdictional purposes. Larger schools often have sophisticated software packages and clearly defined processes with dedicated administrative staff able to collate data. For other schools it may be the responsibility of the office bursar or even for small schools, the school Principal, to ensure relevant data are collected and submitted.

Australian Childcare Alliance New South Wales (sub. 28, p. 6):

Smaller [centre-based ECEC] services will find additional evidence collection requirements more difficult to administer relative to larger services that may have additional team members or centrally located administrative staff to assist with data collection.

Telethon Kids Institute (sub. 15, p. 7):

[The] lack of resourcing [associated with data collection] is particularly acute in the early childhood education and care sector which operates on tight margins and generally has limited administrative support compared to schools.

Schools' and ECEC providers' access to technology also affects their capacity for data collection and processing. This is because they are expected to provide data to governments and school authorities electronically, often through online portals. A range of inquiry participants pointed to a 'digital divide' — a gap between those with and those without sufficient access to computers and the internet (box 4.3). In particular, education providers in regional and remote areas tend to incur higher costs meeting their data collection and processing obligations, because of the cost and availability of reliable internet connections.

Access to technology may also affect data quality. The Independent Schools Council of Australia (ISCA) (sub. 39, p. 9) said that limited internet access 'has resulted in time delays for some schools in their ability to submit data for national collections where an upload of data is required'.

The *National Assessment Program — Literacy and Numeracy* (NAPLAN) will move online from 2017, with NAPLAN tests completed using a computer or tablet instead of a pen and paper. Several participants were concerned that technology issues meant that some

schools will not be ready for *NAPLAN Online*, highlighting the importance of making provisions for schools without adequate access to the necessary technology (APPA, sub. 64; ISCA, sub. 39; NCEC, sub. 49).

Box 4.3 Participants' views on the digital divide

National Congress of Australia's First Peoples (sub. 44, p. 12):

The digital divide may be a barrier to data collection. ICT facilities in remote and very remote areas may be limited. Limited access and facility with ICT may also be an issue to the extent that parents, carers or community leaders may be called upon to provide data.

Telethon Kids Institute (sub. 15, p. 16):

Not all rural and remote locations enjoy the level of access to the mobile network and internet that metropolitan areas expect. Some communities have no mobile network coverage and internet bandwidths may preclude the use of some software. Bandwidths can also vary at different times. In some locations IT service support may be many hours' drive away and very expensive. Funding available to independent, remote community schools is very limited.

National Catholic Education Commission (sub. 49, p. 8):

... [A]ccessibility and adoption of technology is a difficult endeavour for Catholic schools in regional and remote areas such as the Kimberley, parts of the Northern Territory and Queensland. For example, remote Catholic schools in the Kimberley currently rely on satellite technology to transmit enrolment and attendance data, which is an impractical way of conveying information. The cost of data systems and access to broadband internet in remote areas — especially for non-government schools — can be prohibitive.

Independent Schools Council of Australia:

The technological capability of a school is a core component of its ability to collect and collate data, and to transmit and store data efficiently. While many non-government schools and systems have access to adequate computer systems and internet access, some still do not. (sub. DR138, p. 9)

Independent schools in regional and remote areas are limited in terms of available internet service providers and often access can prove to be a costly item in a school budget. Access to satellite ground stations as part of the National Broadband Network will take time to provide extensive cover across the country. The impact of costs to communities to access this service is still unknown. (sub. 39, pp. 8–9)

Australian Council for Educational Research (sub. 32, p. 3):

... older metropolitan schools may not be as technologically capable as other schools, and they may experience similar difficulties to rural and remote schools. Some regions of Australia, urban and rural, do not have access to the national broadband network; some schools do not have adequate technology support; some schools have older technology equipment that cannot handle modern demands.

Duplication

Duplication in data collection or processing adds to the burden on data providers — including schools and ECEC providers, staff and parents. The NSW Government (sub. 79, p. 3) highlighted the breadth of costs associated with duplication:

... [D]uplication of data collection should be avoided, noting the significant expenses involved in collecting, capturing, processing, managing, reporting and storing.

Other participants expressed frustration at the time and effort spent submitting the same or similar data to multiple governments, or government bodies (for example, APPA, sub. 64; ACA NSW, sub. 28; CYDA, sub. 66; CCCC NSW, sub. 51; School of Education and Professional Studies, Griffith University, sub. 76). Even where the required data are similar, the burden on data providers may be compounded by differences in data specifications. The NT Government (sub. 77, p. 3) stated in this regard:

Data provided to national data collection authorities is often similar in nature; however the business rules⁵ surrounding both the initial data capture and final reporting of data can vary greatly. This places a large administrative burden on jurisdictions ...

Duplication in data provision obligations can occur where departments or governments are unable or unwilling to share the information they gather (or to share information in the form preferred by users (box 4.4)). Privacy or other legislative restrictions on the use and sharing of data may prohibit data custodians from sharing information (chapter 5). For example, specific education legislation may prevent the release of personal information collected for a specific primary purpose. Governments (or departments) may in other cases be unwilling to share information because that information could be detrimentally used to assess performance or compare jurisdictions (chapter 6).

Box 4.4 The City of Boroondara's data collection activities

The City of Boroondara collects a lot of data from schools and early childhood education and care providers within its jurisdiction, duplicating other government collections (City of Boroondara, sub. 20). The City acknowledged that 'streamlining data collection would presumably provide some benefits and reduce duplication of effort for services and schools and all levels of government ...' (City of Boroondara, sub. 20, p. 5). However, the usefulness of national data collections to the City is undermined by: the City's inability to analyse national data collections by service, suburb and municipality; privacy issues; and (especially) insufficient data timeliness. This has led the City to conclude 'that national data collection is unlikely to completely replace local data collection currently undertaken by council' (City of Boroondara, sub. 20, p. 4).

In each of these cases, collection of substantially similar information is not necessary to fulfil governments' information requirements, and imposes an unnecessary additional burden on data providers. However, in some cases, schools and ECEC providers are legitimately required to supply substantially similar information to different governments (or government bodies). For example, a school may be required to supply information on students with disability to both the Australian Government and to a state government, using different definitions of disability. This duplication may be reasonable if implementing consistent definitions across the two collections is very costly or difficult, for instance if government funding formulas rely on these different definitions, and would

⁵ In this context, the Commission understands 'business rules' to mean the way in which data must be captured and reported.

have to be adjusted if the definitions changed. The costs and difficulties of achieving consistency across data collections are discussed further in chapter 3.

Duplication in data collection and processing may also occur because of inefficient administrative processes. Schools and ECEC providers already collect for their own purposes much of the information they are required to provide to government. But data for internal purposes and data for reporting purposes have traditionally been dealt with separately. For example, all Independent schools are required to report aggregated attendance data for two ‘reference weeks’ each year to the Australian Government as part of the *Non-Government Schools Census*. Independent schools may also collect attendance data separately for shorter time periods (such as for every class) for their own internal purposes. As another example, many schools collect data on students at the beginning of their first year of full-time schooling, to inform administrative and teaching decisions, but are also (triennially) required to collect data on these students for the *Australian Early Development Census* (AEDC) (APPA, sub. DR89). In a similar vein, the Queensland Government (sub. DR142, p. 7) questioned the need for the proposed national Year 1 assessment and noted that Queensland schools already have a ‘fit-for-purpose literacy and numeracy assessment program’ for students in the first three years of primary school.

In addition to the burden imposed on schools and ECEC providers, families may also bear part of the burden of data duplication. For example, when their child is first enrolled, parents provide a large amount of information to their childcare centre or preschool (appendix C). They will likely be required to provide the same information again when their child enters the Foundation Year of primary school, and again when their child moves between schools, including when they move from primary to secondary school. This inefficient duplication is due to privacy and related legislative restrictions, and the ways in which schools manage information (including that transferring data between ECEC providers’ and schools’ ICT systems may not be straightforward). A unique student identifier could reduce duplication of this sort (section 4.2).

Changing reporting requirements

Changes to reporting requirements impose additional costs on those providing data, particularly when these changes are frequent. For example, the ISCA (sub. 39, p. 4) stated that it is ‘extremely difficult for some schools to make changes to their processes or to add new collections without significant extra effort and cost burden at the school level’. Changes also undermine the comparability of datasets over time.

Where changes are made to reporting requirements, schools, school systems and ECEC providers (or the private vendors who supply ICT systems) need sufficient time to make changes. The ISCA (sub. 39, p. 9) called for at least 12 months to respond to changed reporting requirements to allow for changes to school software systems:

It has been noted that where enough lead time is provided to vendors of [the commercial administrative software used by schools], alterations can be made to accommodate changes in data collections, such as student attendance, at relatively low cost to schools. However, where there is insufficient lead time, schools will either be unable to use software that incorporates the changes due to time constraints or only at a high cost if a vendor has to make changes extremely quickly.

The Association of Heads of Independent Schools of Australia (sub. 50, p. 4) endorsed this submission:

... a minimum 12 months' lead time before data collection or reporting changes are introduced is necessary if commercial software providers and schools are to be able to adapt existing tools and systems to new arrangements.

The Commission has been conscious of the compliance burden when framing its recommendations in this report.

Manual processing

Manual processing — such as converting data from one format to another, collating information, copying information or transporting information — imposes a time burden on those responsible. Excessive manual processing can be due to either duplication (discussed above), or underuse of automated processing methods. For example, schools and ECEC providers that rely on manual accounting methods, rather than using accounting software, are likely to find it much more time-consuming to meet their financial reporting requirements. Expanded use of ICT systems, standards that facilitate the exchange of data between systems, and a national approach to student identification could reduce the burden associated with manual processing (section 4.2).

Excessive manual processing of data also compromises data quality. Data may be missing or incorrect due to processing errors, such as 'coding errors on data entry, ... misalignment of data columns, [or] slippage from one computer system to another' (LSIA, sub. 48, p. 12). Manual processing of data allows more opportunities for these types of errors to occur.

Finally, manual processing can impede data timeliness. A prominent example is the current use of pen-and-paper tests for NAPLAN. These tests require time-intensive manual processing, including the marking of each student's written task by a human assessor. Students' 2016 NAPLAN results were released to schools 3–4 months after students sat the tests (ACARA 2016i). Several participants argued that NAPLAN results would be more useful to schools if they were available sooner (AHISA, sub. 50; LSIA, sub. 48). The

timeliness of NAPLAN results should improve significantly with the move to *NAPLAN Online* from 2017.⁶

Insufficient staff training

The burden of data collection and processing on staff will be greater if they have not received relevant training. Staff that are not adequately trained spend longer performing collection and processing tasks and are more likely to make mistakes that impede data quality.

A variety of skills are required for effective data collection and processing. For example, ECEC educators must assess children against the learning objectives in the *Early Years Learning Framework* (chapter 1) and school teachers must assess students against particular learning criteria and administer standardised assessments to students (including setting up computers correctly for online tests). Where data must be provided to a school authority or government in a particular electronic format, staff may also be required to convert data from one format to another. (Skills related to the use of education data for research and related purposes are discussed in chapter 7.)

Data quality can be compromised if staff responsible for collecting and processing data do not have the requisite skills. The Telethon Kids Institute (sub. 15, p. 9) stated that:

The accuracy and completeness of data will depend on skill levels, individual biases and work pressures of staff completing administrative forms. The availability of staffing and administrative support will also have a significant impact on the data quality.

Similarly, Children and Young People with Disability Australia (sub. 66, p. 7) considered that limited staff expertise and training were affecting the quality of data collected about students with disability:

[The Nationally Consistent Collection of Data on Students with Disability] ostensibly relies on teachers to make assessments regarding the level and types of adjustments students may require despite widespread acknowledgment of the limited expertise held and training available ...

Some stakeholders were concerned with the need for staff training in the use of new technologies. For example, the Australian Childcare Alliance New South Wales (sub. 28, p. 9) received multiple reports of state regulatory officers equipped with iPads to aid their data collection, who were ‘quite open about the fact that they did not know how to use them’. (The Australian Childcare Alliance New South Wales (sub. 28) said that this issue has since been resolved.) Inadequate training may mean that investment in technology is wasted, or even counterproductive in that it leads to a greater data collection burden or worse quality data.

⁶ Schools administering *NAPLAN Online* will receive preliminary results about two weeks after the end of testing (ACARA 2016e, 2016j, 2016k).

4.2 Improving data collection and processing

There is a range of ways to improve data collection and processing, and reduce the associated compliance burden. These include:

- using technology to lower collection costs, minimise duplication (including through better use of existing data) and reduce errors from manual processing
- more effective management of reporting requirements (including accommodating resourcing differences across education providers)
- providing training for staff involved in collection and processing
- choosing appropriately between sample and census data.

Smart use of technology can aid data collection and processing

There are potentially large gains from the smart use of technology. A range of participants supported this view, arguing that better use of technology could reduce the burden of data collection and processing, and improve data quality and timeliness. Support came from the Australian Primary Principals Association (APPA) (sub. 64); Australian Council for Educational Research (sub. 32); Catholic Education Diocese of Parramatta (sub. 23); Early Start, University of Wollongong (sub. 26); and the National Catholic Education Commission (sub. 49). The latter stated that:

Technology can play an important role in achieving timely and quality data ... [and] should enable schools to collect and provide data more easily, thus reducing the administrative burden. (NCEC, sub. 49, p. 8)

The expanded use of ICT systems can reduce the data collection and processing burden on schools and ECEC providers, as will the implementation of national standards to facilitate data transfer between schools, and from schools to governments to meet reporting obligations. A nationally consistent approach to student identification would also make it easier for information about a student to follow that student as they move from one education provider to another (discussed below).

Taking advantage of ICT systems to streamline data collection and processing also offers benefits for researchers, by making it easier and more affordable to capture desired sample or census data designed to answer specific research questions.

The technology to collect information is rapidly improving and increasingly affordable ... This makes whole-of-population data capture more feasible and opens up the potential to minimise respondent burden by undertaking multiple measures at once and providing specific question sets to particular target groups. (Fraser Mustard Centre, sub. DR112, p. 2)

However, some schools, such as small Independent schools, may require additional support in order to access the gains from use of such technologies — and possibly greater ‘lead time’ to prepare for changes in systems (ISCA, sub. DR138).

Expanded use of ICT systems

Schools and ECEC providers are increasingly using sophisticated ICT systems to manage information (box 4.5). ICT systems combine ICT hardware and software packages to record and manage data, and perform administrative tasks. For example, many schools use ICT systems for administering enrolment, attendance, school finances and accounts, timetables, curriculum and teaching resources, student assessment, and managing student wellbeing and behaviour. Government bodies receiving data from schools and ECEC providers also use ICT systems to manage these data.

Box 4.5 **Examples of innovative ICT systems**

Edi

Edi is an ICT system used by all Tasmanian government schools, launched in 2014. It provides school and departmental staff with instant access to school and individual student data through a single portal. It is accessible to school staff anytime, anywhere and by any device (including phones). Individual student data provided are both historical and real time, allowing teachers to access longitudinal data right back to a student's initial school entry, as well as up-to-date information about attendance, behaviour and academic results (*Edi* data are loaded from source systems every night). School leaders and system leaders can also access information at a student, class, school and system level.

Currently, *Edi* is only used by government schools in Tasmania. When a student transfers between government schools, leaders and teachers have immediate access to data about that student's history. Data are not available on students who move to a Tasmanian government school from a non-government school or from interstate.

LEADing Lights

LEADing Lights is a digital transformation initiative to be implemented in Western Australian Catholic schools and early childhood education and care services from 2017. Under this initiative, schools, teachers, students and their families will have access to real-time information through an integrated ICT system. For example, parents will be able to monitor their child's progress in real time, and teachers will be able to view their students' past academic and other administrative records. The system will also enable students to track their own academic performance and maintain a portfolio of work.

Survey of wellbeing and student engagement

The South Australian Department for Education and Child Development collects information about the social, emotional and physical health and wellbeing of students in Years 6 to 9 through a survey based on the *Middle Years Development Instrument*. This opt-out survey is completed online by students at participating schools, and takes about 40 minutes to complete. The Department reported that in 2015, over 29 000 students participated in the survey, at a cost of about \$2.50 per student.

Sources: CEWA (2016); NCEC (sub. DR106); SADECD (2016b); Fraser Mustard Centre (sub. DR112); Tasmanian Government (sub. 75).

Expanded use of ICT systems can reduce duplication in data collection and processing in a number of ways. For example, information about a student's attendance or assessment can be viewed and edited by all relevant staff, without having to create additional separate records. The ability to better share data within schools and ECEC providers using ICT systems means that data need only be entered once. Having a single source of truth for information also avoids the costs and issues involved in reconciling conflicting data.

The burden of duplication on schools and ECEC providers could also be reduced through better use of existing data collections, including through greater sharing of data between jurisdictions and better data linking (for example, ACER, sub. 32; ACA NSW, sub. 28; ISCA, sub. 39; SA NT Datalink, sub. 57). The sharing and linking of education data are presently constrained by a range of legislative restrictions and a risk-averse culture among data custodians that mitigates against greater data access. These constraints would need to be addressed before existing data collections can be used to reduce duplication. Options to address these and other constraints are discussed in more detail in chapters 5 and 6.

ICT systems also reduce the need for manual processing — and the associated burden — through automated processing of data. For example, some schools are required to provide financial reports for both the calendar and financial year, to satisfy the requirements of different departments or governments. If financial transactions are recorded at a relatively granular level (such as monthly) using accounting software within an ICT system, then the software can aggregate these transactions to provide financial reports for both the calendar and financial year without additional manual processing. Another example involves the move to *NAPLAN Online*, which will allow for more automated processing, including automated scoring of the writing task (ACARA 2016k).

The expanded use of ICT systems could also include more real-time data collection and processing. Several stakeholders pointed to the growing opportunities to collect and process data in real time — including using mobile devices such as iPads — to minimise duplication and improve data timeliness (ACECQA, sub. 11; APPA, sub. 64; Early Start, University of Wollongong, sub. 26). For example, staff can enter attendance data directly into a school's ICT system while in class, avoiding the need for manual processing later. Discussing the *National Quality Agenda IT System*, the Australian Children's Education & Care Quality Authority (ACECQA) (sub. 11, p. 13) described how both New South Wales and Queensland:

... have developed tablet and ipad applications which allow their officers to more efficiently record assessment and rating evidence while visiting education and care services. Data from these applications can be imported directly into the [National Quality Agenda IT System], increasing efficiency and reducing the administrative and financial costs of data entry.

Several stakeholders also suggested that the new types of data being recorded in ICT systems by schools and ECEC providers could provide additional valuable data for researchers and policy makers in the future (APPA, sub. 64; SVA, sub. 59). For example, the APPA (sub. 64) suggested that student assessments collected in the normal course of teaching and learning could be aggregated into valuable datasets.

Interoperability standards

Interoperability refers to the ability of ICT systems to communicate, exchange data and use the data that have been exchanged. It relies on technical standards, ‘which act like a common rail gauge for sharing data between ICT systems, allowing information to be exchanged accurately, efficiently and economically’ (NSIP 2016c).

The Australian, state and territory education ministers have endorsed the *Systems Interoperability Framework* (SIF) as the preferred interoperability standards for exchanging data across the Australian schools sector (ECEC providers are not currently included under this agreement) (NSIP 2016a). SIF is also supported by school authorities and key vendors of ICT systems and software (NSIP 2016b). The implementation of SIF across the states and territories is ongoing, supported by the *National Schools Interoperability Program*.

The adoption of interoperability standards reduces the need for manual processing of data by schools or ECEC providers to fulfil data reporting requirements (including duplicative reporting requirements). The implementation of interoperability standards implies schools will not be required to convert data to multiple different formats before submitting them — reducing the data processing burden and the likelihood of errors being entered into the data.

Interoperability of ICT systems will also facilitate the sharing of student data between schools, which could reduce the burden on schools and parents, and boost the information available to schools about their students (particularly new students). For example, when students move between schools, enrolment or assessment information could be seamlessly transferred from the student’s old school to their new school. However, there are legislative and other barriers to data being shared between schools that would need to be addressed (chapter 5). Automated transfers of student data between schools already occur, but only in some jurisdictions. For example, in Queensland when a student moves between different government schools, the student’s prior enrolment information is made available to the new school through *OneSchool* (QldDET 2012).

There are potentially large benefits of expanding interoperability to the ECEC sector. In particular, it would facilitate the transfer of detailed student records between ECEC providers and from ECEC providers to schools.⁷ However, expanding interoperability to the ECEC sector at this time may hinder the ongoing implementation of SIF in schools.

⁷ In some jurisdictions, preschools provide (with parental consent) ‘transition statements’ to schools containing summary information about students entering Foundation Year (appendix C).

A unique student identifier would support information sharing across the education system

A unique student identifier (USI) is a student number that remains fixed and is used by multiple education providers across the course of a student's schooling. It makes it easier for information about a student to follow that student as they move from one education provider to another.

Currently, there is no national system of student identification for schools or ECEC. While most jurisdictions use identifiers for different parts of their education systems, only Victoria (box 4.6) and the ACT use a unique identifier across government and non-government schools. Some states, such as Queensland, have an identifier that tracks students in the government school system only. This means that when children and young people move schools, including from preschool to primary school, from primary to secondary school, between government and non-government schools or across jurisdictions, information on their learning (and related data) does not necessarily follow them. Consequently, each time the student makes such a transition, the new school may have to collect information from the student — including their personal characteristics and background, learning needs and academic progress — ‘from scratch’, without the benefit of the information gathered by the student's previous school(s).

Box 4.6 Victorian Student Number

From 2009, the Victorian Department of Education and Training has issued a *Victorian Student Number* (VSN) to students in Victoria. The VSN is issued to all students in government and non-government schools, and to students under the age of 25 undertaking vocational education and training. It is not issued to children in early childhood education and care, or to university students.

The VSN provides the capability to accurately detect patterns of student movement through, and departure from, the Victorian education and training system. It was introduced to improve the collection and analysis of timely and accurate data about education in Victoria, so that future investment in education and training could be more reliably planned.

Source: VCAA (2016).

The Ministerial Council on Education, Employment, Training and Youth Affairs agreed in 2009 that Australian governments would ‘establish a unique student identifier to track student performance and encourage life-long learning and skill acquisition from the first year of compulsory schooling to post-school education and training’ (MCEETYA 2009, p. 19). This has not happened yet, but there has been some progress towards this goal at a national level. The Data Strategy Group (an inter-jurisdictional working group under the Australian Education Senior Officials Committee) is currently undertaking work on developing a national approach to student identification management in school education (DET, sub. DR143).

In 2015, a nationwide USI was introduced in the vocational education and training (VET) sector. The VET USI was developed to increase transparency by allowing students to: obtain a complete record of VET enrolment and achievement history from a single source; assist employers in verifying training completed; and provide governments with a picture of student numbers, duration and student pathways through the VET system (VicDET 2013b).⁸ COAG has previously said it will consider the extension of the VET USI to other education and training sectors (ACARA 2013f).

As suggested by the Australian Government Department of Education and Training (sub. DR143), the VET USI experience can provide useful lessons for the development of a USI for school students. These include strategies for reducing implementation costs, particularly through building on ‘existing infrastructure, data collection and reporting processes’ (DET, sub. DR143, p. 7). However, it is not necessarily clear whether the VET USI arrangements could be transported in their current form to the school education sector. As argued by participants including the Office of the Australian Information Commissioner (sub. DR140), the VET USI was primarily designed to allow VET students to obtain a record of their training, whereas the intentions for a school USI are likely to be more broad-ranging.

Benefits of a USI

Many inquiry participants highlighted the benefits that would be delivered through a USI that enables student tracking across education pathways (from early childhood), systems and jurisdictions (box 4.7).

A USI has the potential to offer operational benefits to schools, teachers and families, in two key areas:

- by streamlining the collection and processing of data
- by facilitating the sharing of information between decision makers across the education system.

In terms of streamlining data collection and processing, a USI could reduce duplication as students and their families would not need to provide the same information again each time the student changes schools. This is relevant for all students, but particularly for highly mobile students (those who change schools frequently).

⁸ In higher education, the Commonwealth Higher Education Student Support Number is a unique identifier for all students receiving Australian Government support.

Box 4.7 **Participants' views on the benefits of a unique student identifier**

Australian Government Department of Education and Training:

An identity management approach that is nationally consistent would provide improved efficiency in administration, higher quality reporting to parents and would support improvements in better sharing of information across education sectors. Enrolment information could be collected once and a student's documentation maintained across their entire child care, early childhood and school education, providing a comprehensive education record for students, parents, schools and systems. (sub. 68, p. 10)

A national approach to student identity will provide significant advantages to parents and students ... it would provide higher quality and continuity of reporting records to parents and for students and streamlined enrolment processes ... across schools, sectors and jurisdictions. (sub. DR143, p. 6)

Speech Pathology Australia (sub. 35, p. 14):

Unique Student Identifiers may assist in ensuring continuity of important information about the student between schools and educators to assist the incoming school to best meet the needs of that student. It may also offer efficiencies in reducing duplication of testing (for example, repeated speech pathology assessments) if this information 'follows' the student from one school to another.

Australian Primary Principals Association (sub. DR89, p. 2):

The key benefit to schools is being able to access previous school reports or information that will assist the student with the transition into the new school. ... Teaching staff would also be able to prepare and ensure programs to support [students] would be in place and ready to implement.

Murdoch Childrens Research Institute (sub. DR92, p. 4):

MCRI supports the use of a national student identifier. We have seen significant benefits from the implementation of a Victorian Student Number in enabling research to proceed. ... An identifier will vastly improve the accuracy and efficiency of data linkage ensuring timely availability of data [to] researchers and policymakers alike.

National Catholic Education Commission (sub. DR106, p. 10):

A national student identifier system that supports data linkage and reliable longitudinal data, which can be harnessed to build an evidence base that will shape robust education policy, is a missing piece of Australia's national data architecture.

Universities Australia (sub. DR121, p. 2):

A nationally consistent USI approach would allow researchers, governments and education providers to more readily share data and information across the primary, secondary and tertiary education sectors. ... A simplified and streamlined approach to student identification would reduce the complexities and costs of collecting and retaining data over time, and the cost of developing a USI may be offset by future efficiency and productivity gains.

Deakin University School of Education (sub. DR136, pp. 14–15):

The strengths of [a USI] include a minimisation of duplication, greater mobility for working families and students, greater access for the individual to their records from anywhere and increased capacity to provide proof of qualifications to potential employers.

Victorian Council of Social Service (sub. DR141, p. 10):

[A USI] can help track student progress, particularly for transient families who move more frequently between services. Good evidence helps drive practice change and allows services to better cater to student's individual needs. ... For greatest benefit, education providers and community services need to be accurate and consistent when recording student information, and actively use information to identify and support students.

With respect to information sharing, a central advantage of a USI is that it enables schools to access students' historical records of their learning progress and achievement, as well as other personal information, to promote smooth and effective transitions. Rather than spending valuable teaching time collecting information to gauge a new student's capabilities and needs, schools and teachers could use these historical records to prepare appropriate programs and resources 'from day one of the student arriving at the school' (APPA, sub. DR89, p. 2). For example, teachers could use the records to identify students who could benefit from particular interventions, and to inform the development of individual learning support plans (VCOSS, sub. DR141). In this way, a USI would make it easier for schools to cater to students' individual learning needs efficiently, supporting improved outcomes.

A USI also supports families' access to data about their child's learning progress over time. As well as data on students' learning and achievement sourced from standardised assessments such as NAPLAN, students' records could also hold school-based assessments such as portfolios and work samples, as suggested by the APPA (sub. DR89). In this way, a USI could be used to link multiple sources of information about a student's learning outcomes. Particularly in the case of mobile students, a USI would enable a persistent record of their learning progress.

A USI would be particularly helpful in enabling student administrative and achievement records to be transferred seamlessly across school systems — for students moving between government, Catholic and Independent school systems. This is already possible with jurisdiction-wide student identifiers, such as those used in Victoria and the ACT.

Only a small percentage of school students transfer interstate in any one year, based on available indicators (box 4.8). Yet, when considered over the course of a student's schooling life, this may add up to a substantial share of each student cohort that transfers across jurisdictions. It is difficult for information to follow these students when they move interstate, under current jurisdictional USI arrangements. Privacy and other legislative restrictions prevent those records from being transferred (without parental consent) when a student transfers to a school in another Australian jurisdiction. A nationally consistent system of jurisdictional student identifiers (where they are issued and managed by each state and territory, but in a way that can be linked consistently across jurisdictions) could help to address this problem. From 2006, the *Interstate Student Data Transfer Note* system has facilitated the exchange of information about students moving between schools in different states (subject to parental consent). However, this system involves significant manual processing, and does not include detailed student information of the kind that could follow students moving between jurisdictions under a national USI system.

Box 4.8 Student mobility across jurisdictions

There is no consistent and comprehensive measure of the extent of inter-jurisdictional transfers among Australian school students. However, some indicative measures of the extent of interstate mobility are as follows.

- Approximately 58 000 Australian school-aged students (aged 5 to 19) moved interstate in 2015 (ABS 2016b) — less than 2 per cent of the 3.75 million students enrolled Australia-wide (ABS 2016f).
- About 1.7 per cent of people aged 15 to 64 years moved residence interstate in the year prior to the 2011 Census of Population and Housing (PC 2014b). Although this is a general population indicator, many of those moving may have had school-aged children — so it gives a sense of the extent of jurisdictional mobility in Australia.
- About 0.5 per cent of all students commencing secondary schooling in WA government and non-government schools have arrived from other Australian jurisdictions, according to data for the years 2014 to 2016 (data supplied by WA Department of Education, pers. comm., 3 November 2016).

In addition to these operational benefits for schools, students and families, a USI is one method of facilitating data linkage for research purposes. The importance of longitudinal analysis for better understanding the long-term impacts of specific practices or interventions was also noted by several participants (for example, SLRC, sub. DR93). Although a USI is not the only way to achieve data linkage (discussed below, and in chapter 6), it would make linkage easier and more straightforward, and avoid the errors associated with statistical linkage processes (chapter 6).

The value of a USI for supporting quality and cost-effective research was underscored by the UK-based Education Endowment Foundation (EEF) (sub. DR97). The EEF argued that the UK *National Pupil Database*, which includes a USI, plays a crucial role in providing linked student assessment data to support the EEF's evaluation work.

It is worth highlighting that the EEF would not be as effective and efficient as we are, nor would we be able to track the longer term impact of our work as well, without the National Pupil Database (NPD) ... The NPD allocates each child in England with a unique pupil number; the database contains basic administrative information ... attainment on national tests ... as well as information on key demographic characteristics ...

The main benefits of the NPD for the EEF's agenda are worth bearing in mind ...

- Cost effective evaluations — Wherever possible, the EEF's independent evaluation teams use national tests as our baseline and/or outcome measures in trials. This reduces testing costs (we don't have to pay for separate, bespoke tests as we make use of assessment that is happening in schools anyway) ...
- Data tracking — All students in EEF trials can be matched to the NPD in the EEF's data archive. This allows us to a) track the longitudinal impact of all our projects to determine whether the immediate impact of a programme is sustained over time; and b) allows us to make comparisons between EEF programmes using a common data set. (EEF, sub. DR97, pp. 5–6)

Easier data linkage would also make conducting longitudinal research and analysis more accessible, promoting contestability, transparency and replicability in education research. For example, it could promote the involvement of teachers, schools and community organisations as partners with researchers, by reducing the need for complex statistical techniques to achieve data linkage.

However, there are limitations to the use of a USI for data linkage — most notably that it would be insufficient for supporting linkage with data from outside the education system. This limitation, and alternative methods for achieving data linkage, is discussed in detail in chapter 6.

In summary, by promoting sharing of information to be used by schools, teachers, families, students, researchers and other decision makers, a USI would offer benefits that align with the framework for developing the national education evidence base, set out in chapter 2. It would support monitoring of student learning progress and achievement over time, and enable evaluation of the impact of interventions on education outcomes, through longitudinal analysis. It would make timely, relevant and specific information accessible to schools and families to support their daily decision making. It would also meet the needs of researchers and policy makers for long-term, high-quality linked datasets that support research and analysis.

Costs of a USI

At the same time, introducing a USI would impose costs, as well as some implementation challenges. Several inquiry participants expressed concerns about the potential costs and risks across two key areas:

- the administrative and technological requirements of implementing a USI
- privacy and data security issues (box 4.9). (Note that some participants raised both benefits and concerns in relation to a USI.)

First, some participants expressed the view that a USI would impose administrative costs on schools and teachers. They emphasised that these costs would need to be justified by clear benefits to schools in terms of useful information to support student transitions (benefits that have been canvassed above). One participant (ISCA, sub. DR138) also submitted that some Independent schools might require financial assistance to enable them to be technologically capable of implementing a USI.

Box 4.9 Participants' concerns about a unique student identifier

National Catholic Education Commission (sub. DR106, p. 10):

... the desire for a national approach to managing student identity should not disrupt the considerable work under way at the state, territory and sector level in relation to student identity management.

Australian Primary Principals Association (sub. DR89, p. 4):

The concept of a student identifier raises concerns around privacy and access to information. ... The process would need to have regular reviews in place to ensure permissions were still current and changes to a student's circumstances were updated.

Population Health Research Network (sub. DR110, p. 2):

The cost of moving towards a national student identifier may [limit] education research because:

A. The use of a Unique Student Identifier will not solve the problem of linking education data to data collections outside of the education sector such as births, deaths, hospital, justice and housing

B. There are legislative and ethical barriers to using an identifier created for one purpose which is then used for another purpose.

Deakin University School of Education (sub. DR136, p. 15):

There are significant potential benefits but also potential risks, including data security and privacy. These would need to be managed very carefully.

Independent Schools Council of Australia (sub. DR138, pp. 6, 9):

Introducing a USI into the school sector would require a significant upfront investment. The experience of Victoria in introducing a cross-sectoral USI was that it was a significant undertaking both financially and in terms of supporting schools through the process and also on an on-going basis. There is also a very strong view that a USI is not necessary in the schools sector and that the same benefits could be achieved through data linkage.

... [A] lack of technological currency impacts on the ability of [some Independent] schools to adopt new practices or to undertake additional data reporting. For the Independent sector it is a significant impediment to the introduction of possible changes such as a Unique Student Identifier. Many schools would require assistance to implement such a change to their systems, and it is possible that for a subset of Independent schools, such a change would not be possible without a significant financial investment by government(s).

Office of the Australian Information Commissioner (sub. DR140, p. 4):

As part of any assessment of the costs and benefits of moving towards a national unique student identifier (USI), I would encourage the Productivity Commission to consider the costs associated with the potential intrusion on individuals' privacy. It is important to ensure that the privacy risks of a national USI scheme do not outweigh its benefits to the community.

The introduction of a national USI creates an increased risk that the identifier, and information associated with it, will be able to be used beyond the original purposes. Such linkages may combine personal information that has been collected for very different purposes and create rich datasets about individuals' interactions in society. This creates the risk that the data may be put to unforeseen purposes beyond the research purposes contemplated in the creation of the data set.

Queensland Government (sub. DR142, p. 10):

While there are benefits to being able to more easily monitor students across jurisdictions and sectors via a USI, the costs associated with implementation of a USI should not be underestimated.

In addition, there was some concern that a national USI system would unnecessarily duplicate the existing work undertaken by states and territories (such as the Victorian student identification system). This concern lends further weight to the approach of

implementing a system of nationally compatible jurisdictional identifiers, rather than a single (centrally administered) national USI.

Second, a number of participants drew attention to potential privacy and data security implications of a USI (box 4.9). A first step in assessing and managing these risks would be to undertake a privacy impact assessment (PIA) for arrangements around a USI (OAIC, sub. DR140). A PIA involves assessing the potential impact of a project (such as a new or amended policy or program) on individuals' privacy, as well as recommendations for strategies to manage, minimise or eliminate this privacy impact (OAIC 2014a). For projects that involve personal information (such as a national USI system), the Office of the Australian Information Commissioner strongly advises conducting a PIA early in the planning process, so that the results of the assessment are able to influence the project design (OAIC 2014a). Privacy issues are discussed further in chapter 5.

The integrity of a USI could also be maintained through protocols for ensuring the quality and confidentiality of student records. This should include processes for enabling students and their families to view what information is held about them and the current set of permissions for this information (who can access it and for what purposes). This could be done, for example, through password-protected online accounts that give students and their families control of the personal information associated with their identifier (DET, sub. DR143). (However, as suggested earlier, some schools might require assistance to attain the technological capabilities required for such an approach.) Allowing families and students to view their personal information and related permissions would be crucial for maintaining students' and families' sense of control and agency, in turn promoting their trust and willingness to provide accurate and useful information. Families should also be able to update their child's enrolment details to ensure they are current (APPA, sub. DR89) so that decisions are not made on the basis of outdated or inaccurate information.

In addition, some participants expressed concern about the risk that linked data may be used for inappropriate purposes or for purposes unforeseen when the data were collected. This highlights the need to accompany the introduction of a USI system with a clear set of protocols for how both the identifiers and the student records are to be used — a 'robust legislative framework setting out clearly defined uses of the USI and information associated with it' (OAIC, sub. DR140, p. 4).

Some participants questioned whether data linkage could be achieved in ways other than through a USI, such as through statistical linkage (ISCA, sub. DR138; PHRN, sub. DR110). As discussed in chapter 6, data can be linked using various methods. For example, an alternative to a USI is using statistical linkage techniques to locate data records on a given student from multiple datasets (chapter 6). However, the accuracy of such techniques depends heavily on the quality of the data and on consistency in the way student characteristics are recorded. As a result, these techniques are subject to some degree of error. For some applications, such as evaluative research and analysis on the effect of interventions on populations or sub-populations of students, there may be tolerance for a small measure of error. However, for operational applications, most notably

for teachers, schools and families and students themselves, accessing the history of a student's learning and achievement in order to inform decision making and identify supportive interventions, mis-identification of a student would not be acceptable.

How a USI could be implemented

In light of these costs and benefits, the Commission considers that a USI would offer net benefits for improving education outcomes through supporting the evidence base, if it were implemented through a nationally consistent system of jurisdiction-based student identifiers. Under this approach, states and territories would be free to implement their preferred student identification management systems, provided that the student identifiers generated are nationally consistent and compatible — that is, they are able to be linked and are nationally unique and remain fixed for each Australian student over time.⁹

This approach would respect, and make best use of, the existing progress and work underway by jurisdictions in their own student identification management systems, while gaining the additional benefits of national linkage (for operational as well as research purposes). It would mean that the timing of implementation could be determined by individual states and territories in accordance with their needs and practical considerations (such as to coincide with scheduled upgrades of their ICT systems). Furthermore, it would enable jurisdictions to learn from one another, as early adopters could offer assistance to other states and territories based on their experiences, as well as providing 'proof of concept' by showing the benefits derived from schools, teachers and students accessing and using the linked data.

As noted above, it would also be essential to put in place appropriate arrangements to safeguard students' privacy and confidentiality, through a set of protocols that stipulate who may access the linked data, under which conditions and for what purposes. Finally, it is vital that all Australian governments, in seeking to implement a USI, communicate effectively with all decision makers in the education system (including schools, ECEC services, teachers, students and their families) about the value of a USI for their purposes and the conditions under which it will operate (OAIC, sub. DR140). Using an appropriate communications strategy to convey this information in a relevant and accessible manner would assist in gaining the support and trust of schools, teachers and families, in order to maximise the benefits from a USI.

Beyond the school system — linking to ECEC and post-school outcomes

There would be benefits in a USI that covered children in ECEC as well as students in school and post-school education and training, as noted by the Australian Government

⁹ One way of doing this, for example, would be for jurisdiction-based identifiers to be prefixed with a state-based identifier to create a national 'de facto' USI. For instance, a Victorian Student Number would be prefixed with VIC, a Queensland identifier with QLD and so on. This would ensure the identifiers would be nationally unique.

Department of Education and Training (sub. 68). It would reduce duplication in data collection as children move from ECEC to school, and could provide schools with rich information about children entering Foundation Year (such as details about any behavioural issues). In New Zealand, for example, children are allocated a *National Student Number* when they enrol in an ECEC service, and this number stays with the child through their primary, secondary and tertiary education. Information is collected on a child's ECEC experience, including enrolment and attendance (New Zealand Ministry of Education 2014a, 2014b).

In light of the significance of children's early experiences for their subsequent outcomes (chapter 2), being able to link data on children's ECEC experiences with their later school outcomes would also help researchers to better understand the effect of factors such as the quality of early learning programs and children's hours, days and years of attendance (a gap identified in chapter 3). Many inquiry participants echoed this perspective, arguing that there would be substantial benefits from extending a USI to cover the ECEC period (ACECQA, sub. DR108; Goodstart Early Learning, sub. DR135; Mitchell Institute, sub. DR103; MCRI, sub. DR92; Telethon Kids Institute, sub. DR129; Universities Australia, sub. DR121).

For example, ACECQA (sub. DR108, p. 4) considered that:

Having a single national student identifier that covered the early childhood education and care and school sectors would enable researchers to track a (de-identified) individual's trajectory through the education system and look at the impact of early childhood education and care and other factors on later outcomes.

However, extending a USI to include ECEC would also involve significant challenges and costs — not least the administrative costs of centrally allocating and managing a USI for children in ECEC. Some participants (such as ACECQA, sub. DR108) suggested building upon existing unique identifiers in the ECEC sector, in order to reduce administrative costs. For example, one possibility might be to use the *Customer Reference Number*, a unique number issued to each child who participates in childcare. However, this might face legislative restrictions on the use of the data, as childcare administrative data are 'protected data' under family assistance law (DET, sub. DR143). Furthermore, the *Customer Reference Number* does not apply to children who attend standalone preschool programs (as distinct from Australian Government funded childcare services), nor to children who do not participate in (formal) ECEC at all.

Nevertheless, in light of the potential benefits, further work should be done on developing feasible ways of extending a USI to the ECEC sector. Consideration should be given to scheduling such a project to coincide with an upgrade of the childcare ICT system, to reduce implementation costs (DET, sub. DR143).

There could also be value in extending a USI to cover students' post-school outcomes. Some participants highlighted the need for longitudinal analysis to better understand students' long-term pathways through the education system, including beyond secondary

school. Linking data on students' school performance and characteristics with subsequent outcomes could yield insights into the long-term effects of particular programs and interventions (Mitchell Institute, sub. DR103, trans.). Although post-school outcomes are beyond the scope of this inquiry, this appears to be an area worth considering in the development of a national USI.

RECOMMENDATION 4.1

The Australian, state and territory governments should prioritise the work of the Data Strategy Group to develop a nationally consistent system of unique student identifiers. In doing so, governments should ensure that the resulting system:

- minimises implementation costs, by building on existing jurisdictional, school and school system student identification management systems and processes, and by taking advantage of scheduled technological upgrades
- proactively manages privacy and data security concerns, including through the preparation of a Privacy Impact Assessment early in the planning process.

Further, the Data Strategy Group should examine and develop feasible ways of extending a unique student identifier to the early childhood education and care sector.

Effective management of reporting requirements can ease the collection burden

As mentioned earlier, the burden of reporting requirements does not fall equally on all education providers (section 4.1). Providers that do not receive administrative support from a school system or ECEC network, that are small and lack dedicated administrative staff, or that are remote and have poor access to internet services may find meeting reporting obligations particularly burdensome. These issues are not easily resolved but can be ameliorated by ensuring that reporting requirements are sufficiently flexible and managed appropriately. In this context, frequent changes to reporting requirements and inadequate staff training increase the burden on schools and need to be considered in advance.

Some participants suggested that additional targeted funding was needed to improve access to technology for the purpose of data collection and processing (for example, SCISA WA, sub. 14). The Commission considers that schools (or school authorities) and ECEC providers are best placed to decide how much should be spent on their ICT systems and internet access. This expenditure must be considered in the context of alternative expenditure options and budget constraints, and the benefits of ICT expenditure, all of which vary between schools and ECEC providers. For example, there would be little benefit from a school investing in a system that communicates with parents through an internet application if parents do not have access to the internet — as is the case in some regional and remote communities (National Congress of Australia's First Peoples, sub. 44). Whether schools and ECEC providers have sufficient funds to pay for ICT systems and

internet access should thus be considered as part of broader funding decisions, which are outside the scope of this inquiry.

Government reporting requirements should accommodate schools and ECEC providers with inferior access to technology. Submissions to this inquiry provided some evidence of such accommodation. For example, the School Curriculum and Standards Authority, Western Australia (sub. 14, p. 12) stated:

The Authority collects student registration, demographic, participation and performance data directly from schools. The electronic transfer of this information ranges from the manual upload of .CSV (comma delimited) files or by direct link from school database systems provided by the Western Australian Department of Education in public schools or by software suppliers in Catholic Education and some independent schools. Some schools do not have the resources or expertise to enhance their technologies and hence the Authority's database management system has to allow for this wide range of data transfer technology.

Similarly, the Australian Curriculum, Assessment and Reporting Authority (sub. 62, pp. 6–7) has taken a flexible approach to *NAPLAN Online* to allay concerns (noted in section 4.1) that some schools will not be ready:

A variety of solutions are being implemented to enable schools to participate in NAPLAN online in instances where there are issues with limited devices and/or difficulty with access to the internet. For example, the expanded 'window' for testing will allow schools more flexibility in scheduling and accommodates schools which have fewer devices than students.

Changes to reporting requirements must be managed so as to minimise the additional cost of changes on those providing data. In particular, governments should ensure that schools and ECEC providers are not obliged to make changes to their data collection and processing systems (including ICT systems) within inappropriate timeframes. As noted in section 4.1, some participants called for at least 12 months lead time to changes to reporting requirements so that ICT systems can be changed without incurring excessive costs. Announcing changes well before they come into force and allowing a switch over period can help reduce the transitional costs. For example, the implementation of *NAPLAN Online* will be staggered 'over a two-to-three year period', with timing of participation determined by jurisdictions, school systems and schools, based on readiness (ACARA 2016k).

Sample versus census data

Some inquiry participants argued that the burden of data collection and processing would also be reduced if data were collected using a sample of students, rather than the population (census data). For example, the ISCA (sub. 39) argued that sample testing is less invasive and disruptive in schools. Surveys and testing programs administered to samples of students can significantly increase the breadth of information collected and provide for high-quality evidence and at lower cost than censuses. The robust analysis of disadvantaged groups can be facilitated by oversampling — collecting sample data on a greater proportion of students from a particular subgroup than they represent in the population (UWA Faculty of Education, sub. 10).

However, other participants emphasised the importance of census data for a range of purposes where sample data would not be appropriate (box 4.10). One key purpose is to support funding allocation (DET, sub. DR143). Another important function of census data identified by participants is to enable analysis of sub-populations (such as disadvantaged groups) in order to provide appropriate interventions at a school and community level. For example, the Murdoch Childrens Research Institute (sub. DR92, p. 4) noted that census data such as the AEDC are vital for facilitating analysis of small, vulnerable sub-populations that are ‘both less likely to enter sample studies and more likely to drop out over time’.

This highlights the need for the choice of census or sample data to be based on the ‘fitness for purpose’ and net benefits principles set out in chapter 2. To reduce administrative and compliance costs while also maintaining the benefits of appropriate forms of data collection, the Commission considers that:

- census data should be used as a ‘backbone’ for supporting funding allocation and maintaining a basic national set of student administrative and performance data
- sample data should be used to enable more in-depth research and analysis on specific matters, such as evaluation of the impact of particular programs and interventions. Where possible, census data should be linked to sample data so as to reduce the need to duplicate existing large-scale assessments for the purposes of research and evaluation. (Data linkage is discussed further in chapter 6.)

RECOMMENDATION 4.2

Agencies responsible for collecting education data should review and adjust their procedures to reduce the administration costs and compliance burden on respondents, including by:

- removing duplication in data collection and processing
- avoiding frequent changes to reporting requirements, but when changes are necessary, allowing sufficient time for respondents to comply with the new requirements
- using census data collections to maintain a basic national set of student administrative and performance data, and sample data collections to enable more in-depth research and analysis on specific matters
- making maximum use of existing large-scale assessments for research and evaluation purposes by linking sample data to census data where possible.

Box 4.10 **Participants' views on the use of sample and census data collections**

University of Western Australia Faculty of Education (sub. 10, p. 2):

It is not always necessary to have data on the full population to undertake valuable research. Surveys and testing programs administered to samples, some of which may be specifically directed to high risk or disadvantaged groups, can significantly increase the breadth of information collected.

Association of Heads of Independent Schools of Australia (sub. 50, p. 2):

Sample testing and surveying provide rich information for policy development and minimise administrative burdens for schools and intrusion on the privacy of families and students.

Australian Primary Principals Association (sub. DR89, p. 2):

APPA strongly supports the notion of student cohort sample testing to gain national and system data for monitoring and trend observations.

Murdoch Childrens Research Institute (sub. DR92, p. 4):

... census data provide powerful tools for small area and subpopulation analyses. In our view sample-based approaches should not be considered alternatives to what can be achieved with data linkage across full populations. ... the costs and practicalities of recruiting and maintaining sufficiently powered samples poses massive challenges and one could argue has greater administrative and respondent burden. In contrast, embedding data collection into universal services can create longitudinal census data through linkage. More detailed samples of specific groups can then be built off this backbone for considerably less cost.

Mitchell Institute (sub. DR103, p. 4):

Decisions about methodology should be driven by the objectives of the data collection rather than an apriori privileging of one method over another. There are instances – such as the AEDC – where the data could not be replaced by a sample without losing the underlying purpose and utility of the data. The AEDC provides small-area data and unparalleled coverage of disadvantaged cohorts, neither of which would be achieved through sampling methodologies.

Fraser Mustard Centre (sub. DR112, p. 1):

... balancing the potential value of the information gained against the costs ... in some cases may support the use of sample-based surveys and in other cases would support the collection of data as a census. For many areas of responsibility of the education system, there is significant heterogeneity between students and between education sites. This makes whole-of-population data necessary for planning purposes and invaluable for evaluating programs and spending.

Australian Government Department of Education and Training (sub. DR143, p. 6):

... where the primary purpose of the data collection is to determine a level of funding based on a per student enrolment, then a full cohort census may be warranted. This data then might be used for other secondary purposes. Another example is in relation to assessment, where the primary purpose is to inform parents/teachers of an individual student's achievement level or to provide diagnostic information, then a full cohort testing should be used.

However, for the purpose of research or potentially system level indicators, sample or survey data, and periodic rather than annual collections, may be the most cost-effective mechanism to obtain the information needed.

NSW Government (sub. DR145, p. 5):

As regards sample data collections, while appropriate in some cases, these have limited functionality, for example for purposes such as creating value-added measures.

Improved training in data collection and processing

Several stakeholders called for additional training or professional development for education staff in how to collect and process data (for example, Early Start, University of Wollongong, sub. 26). Some of these stakeholders referred specifically to the need for training in working with technology (ACA NSW, sub. 28; National Congress of Australia's First Peoples, sub. 44).

Governments, schools, school system authorities, unions and other bodies in the education sector provide support (including funding) for staff professional development (usually unrelated to data collection and processing) (Aussie Educator 2016). For example, in 2013, the Australian Government launched the *Long Day Care Professional Development Programme*, which provides funding for professional development for staff in long day care centres. Accredited teachers and early childhood educators may also be required to spend a set amount of time in professional development each year.

Staff should be adequately trained to ensure that data collection and processing is not overly burdensome, and so that the data provided are of sufficient quality. In particular, there may be a need for additional training when reporting requirements change. The requirement for staff training also points to the need for governments to allow sufficient time between the announcement of changes to reporting requirements and their implementation.

4.3 Data reporting tools

In addition to aiding with data collection and processing, technology can assist with the dissemination of those data to education stakeholders — poor reporting of data impairs the effective use of data. Governments, school system authorities, schools and ECEC providers are using technology to improve the access to and presentation of data in a manner that is easy to interpret by educators, parents and the community.

Government bodies are making greater use of websites and web-based software to report more data, and to provide them in a user-friendly and interactive way. *My School* is a prominent example. It provides a variety of information about every school in Australia, and tools that can be used to explore schools' NAPLAN results (box 4.11). In the ECEC sector, ACECQA has begun publishing an online version of its quarterly *National Quality Framework* snapshot, where users can manipulate and download data (ACECQA, sub. 11). Many of these websites are (or will soon become) mobile-friendly, improving access for parents and other data users.

Box 4.11 *My School*

The *My School* website, launched in 2010, provides educators, parents and the community with information about each of Australia's schools in a readily accessible format. *My School* contains a range of information about schools, including *National Assessment Program — Literacy and Numeracy* (NAPLAN) results, financial information and attendance rates (ACARA 2016g).

My School includes tools that allow users to explore schools' NAPLAN results. For example, results can be viewed in different formats, and for different subjects, year levels and years. Users can also see the change in results over time as a particular cohort progresses, such as the change in a cohort's reading scores between Year 3 and Year 5. Results can be compared with other schools serving students from statistically similar backgrounds. Several state governments provide additional software to schools for the purpose of analysing NAPLAN results (AHISA, sub. 50). The Independent schools sector has invested in similar software (Thian 2010).

Many schools and school authorities have developed or purchased software that allows teachers and school leaders to analyse student, class and school data. This software sometimes forms part of schools' ICT systems (discussed above). The WA Government, for example, provides the *Student Achievement Information System*, a web-based graphing application that assists teachers and other staff to analyse student achievement (WADET 2010a). The Association of Heads of Independent Schools of Australia (sub. 50, p. 3) argued that the increasing tendency of schools to develop or invest in easy-to-use analysis tools 'mean teachers do not need high level IT expertise to manipulate the data or extract the information they need, and therefore minimises professional learning costs'.

These developments and initiatives that governments and schools are adopting to make the reporting of data collections simpler to use and easier to interpret by educators, parents and the community are welcomed by the Commission.

5 Access to education data

Key points

- The public interest benefits of allowing greater access to education data are substantial but they need to be balanced against the legitimate risks to individuals and governments associated with misuse of those data.
- Getting the right balance between access and avoidance of adverse outcomes is hampered by the complexity of the legislative environment governing the management of personal information and an (understandably) risk-averse culture among data custodians and ethics approval committees.
- Access to, and sharing of, data generally would be substantially improved through reforms currently under consideration in the Commission's draft report on Data Availability and Use.
- In the meantime, there is also scope to improve access and sharing arrangements for education data through changes to the existing legislative framework.
- Most states and territories allow exceptions to privacy protection of personal information for purposes deemed to be in the public interest (including education research). They also permit sharing of data containing personal information with other jurisdictions provided those jurisdictions have substantially similar privacy principles; effectively, mutual recognition.
- Differences in Australian and state and territory education Acts and other related laws impose greater limits on the ability of education data custodians to release data that contain personal information. These differences can prohibit entire data collections from being accessed, or prohibit disclosure of component cohorts of the same dataset. In other cases, legislation is silent on whether and how personal information is to be managed.
- Greater uniformity of laws governing the management of personal information would go some way towards reducing the complexity of the legislative environment. This could be achieved by amending existing legislation so that it provides for use and disclosure of personal information in specified public interest circumstances. Alternatively, overarching legislation that allows for use and disclosure irrespective of the provisions contained in other Acts or laws could be enacted.
- Greater access to data would also be facilitated if processes for collecting personal information were amended to incorporate formal consent and/or notification for the use and disclosure of personal information at the initial point of collection.
- Introduction of policy guidelines at the federal and jurisdictional level which place an onus on data custodians to release data, unless an exception can be justified, would provide data custodians with a mandate to release data and mitigate the risk aversion evident in the current system.
- Following the lead from the health domain, a system of mutual recognition of approval decisions by data custodians and ethics committees would make the process of accessing education data faster and cheaper.

There is a considerable amount of education and other data already collected and the benefits of gaining access to that data by groups with an interest in improving education outcomes (academic researchers, teachers, schools and policy makers) are substantial. But data access is being impeded by the complexity of the legislative environment governing the management of personal information and an understandably risk-averse culture among data custodians and research ethics committees. A number of participants referred to these impediments in submissions to this inquiry (box 5.1).

Together, these and other factors represent significant challenges to data access. While there are a number of alternative approaches available to overcome those challenges, the potential success of those alternatives depends on the extent to which they change the underlying incentives facing education data custodians and ethics approval authorities. Current incentives operate to discourage access because the benefits of improved education research and policy development are spread widely across the community, while the consequences of adverse outcomes (from potential misuse of data) are borne primarily by the custodian (and through them, the individuals whose personal information is potentially compromised).

In addition, the costs to data custodians of preparing data for use by researchers (including de-identification) are not insignificant. According to a recent paper which looked at access to health data it is likely that one of the reasons for the reluctance to provide health data is that government departments are not funded to meet the costs of data preparation (Adams and Allen 2014). The authors argued that the adequacy of funding for these services should be addressed:

Provision is made for the collection, maintenance and protection of data but less attention is paid to supporting the objective of maximising the beneficial use of the data. The appropriate balance between cost recovery for data services, which is met from research funding, and access supported by departmental budgets needs to be resolved. (Adams and Allen 2014, p. 969)

Ultimately, barriers to data access (and onerous ethics approval processes) can lead to perverse outcomes for the education system. This tension was highlighted in a submission by the Australian Research Alliance for Children and Youth (sub. DR116, p. 9):

As noted in the [Commission's draft] report, even when the ethics approval hurdle is overcome there are multiple other barriers to researchers obtaining the data required for analysis including privacy and other legislative hurdles.

These factors bias decision making of education administrators towards introduction of new interventions without evidence. We presume this is an unintended consequence of ethics processes, not system design.

Moreover, system-wide level of difficulty in researchers obtaining and analysing information increases the risk of interventions with no evidence base becoming entrenched practice and remaining unexamined.

Box 5.1 Participants' views on data access impediments

The Population Health Research Network (sub. 24, p. 3) summarised the nature of the data access problems in the following terms:

Australia has a complex legal framework governing the collection, use and disclosure of data for research. There is also variation between jurisdictions and in the clarity and terms of individual legislation. Whilst in most cases the empowering legislation permits the use and disclosure of data for research, provisions in the various education statutes may limit access to education data and each research project may need to be considered on a case by case basis.

Similarly, the Tasmanian Government (sub. 75, p. 5) pointed to differences in privacy legislation and the impact this had on cross-jurisdictional co-operation:

The lack of uniformity of privacy legislation across states has certainly impacted upon the willingness of jurisdictions to participate in cross-jurisdictional research and projects which have the capacity to enhance educational outcomes. Through this [PC] inquiry, the review of national privacy arrangements would potentially remove some significant barriers for some jurisdictions. It should be noted that these barriers are often perceived rather than real.

The Australian Institute for Teaching and School Leadership (sub. 5, p. 3) nominated privacy issues as a barrier to developing a dataset that would improve education outcomes:

A more comprehensive approach to teacher workforce data has great potential to improve outcomes for students. However, issues such as privacy, ownership of and access to the data, and consistency with the legislative basis for its collection all require resolution.

The Australian Research Council Centre of Excellence for Children and Families over the Life Course (sub. 9, p. 3) suggested differences in privacy laws were a significant obstacle to developing a national education evidence base:

Differences in data governance structures and privacy legislation across states ... are associated with a raft of issues that make collating consistent data across the country very difficult.

Legislative complexity has resulted in approval authorities adopting what some described as a cautious approach to granting access to data. The Australian Curriculum, Assessment and Reporting Authority (sub. 62, p. 5) said in this regard:

Decisions about sharing and access to de-identified personal information are often made in the absence of certainty around the application of privacy legislation, leading to conservative decision making.

The Queensland University of Technology Faculty of Education (sub. 19, p. 14) highlighted problems with ethics approval processes and the requirement to gain individual consent:

Australian educational researchers have difficulty with jurisdictional ethical applications and consent rates that require parents to complete paper consent forms for students to participate in research.

The National Catholic Education Commission (sub. DR106, p. 8) referred to the tendency to treat privacy legislation differently in the Australian education sphere than elsewhere:

Privacy legislation is an important consideration when developing a national education evidence base. However, there is an inclination in the education sector to accept privacy barriers as inevitable in a way that does not apply overseas or, for example, in the health sector locally.

The Centre for Independent Studies (sub. DR126, p. 2) raised restrictions on *My School* data access:

The original intention was to graph the relationship between ICSEA scores and government funding with respect to the school sectors. However, this goal was not realised: even though the MySchool website's school profiles present both sets of information, it is not possible to source from ACARA a spreadsheet containing both school finance and ICSEA score data. For such a large dataset, manual matching was not a realistic prospect and this constituted an impediment to effective use of the data.

FINDING 5.1

There is a considerable amount of education and other relevant data already collected, but there are major impediments to its access and use.

The Commission's broader inquiry into Data Availability and Use

The proposed reforms in the Commission's *Data Availability and Use* draft report would address these and other impediments to data access across all data domains (including education). Key reform elements are detailed in box 5.2. At the centre of the proposed framework is the introduction of a new *Data Sharing and Release Act*, a new National Data Custodian, and a suite of sectoral Accredited Release Authorities that will enable streamlined access to curated datasets.

Particularly relevant in an education context, for those datasets designated as National Interest Datasets, all restrictions to access and use contained in a variety of national and state legislation, and other program-specific policies, would be replaced by new arrangements under the *Data Sharing and Release Act*. National Interest Datasets would be maintained as national assets, access would be substantially streamlined, and linkage with other National Interest Datasets would be enabled where relevant.

The reforms are based around several core principles including:

- defining a comprehensive right for individuals to control the data collected about them (or their children)
- giving permission to data custodians to release de-identified data
- enabling use of identifiable data by trusted users
- facilitating voluntary release of state and territory government datasets (including education data) to the national system.

The Commission anticipates that implementation of this comprehensive reform framework will take some time given the significance of the legislative and other changes required and the need for extensive community and stakeholder engagement:

Negotiation and consultation will be required with state and territory governments (as significant data holders); some parts of the private sector (for similar reasons); and with sectoral groups where [National Interest Datasets] are sectoral in nature (health or education). (PC 2016a, p. 24)

Against that background, the proposals outlined in this separate inquiry into the National Education Evidence Base are designed to improve access to education datasets within (largely) the current legislative framework. Some of the recommendations in this report would become redundant if the recommendations in the Data Availability and Use draft report are implemented.

Box 5.2 **The Commission's *Data Availability and Use Inquiry***

The key legislative component of the Commission's draft report proposal to facilitate data sharing and release involves the creation of a new piece of Commonwealth legislation — the *Data Sharing and Release Act*. The new Act would apply across Australia to all digital data and would override clauses in other data-specific and program-specific legislation relating to privacy, secrecy and other matters. A Comprehensive Right for individuals to access, seek amendment to and be informed about disclosure of information held about them, and transfer their data to a third party, would be established. Individuals would also have an explicit right to opt out of a collection process except in some circumstances including where data form part of a National Interest Dataset (NID) — likely to encompass education data.

The draft recommendations outline a framework for public and private datasets to be nominated and designated as National Interest Datasets. For these datasets, all restrictions to access and use that are contained in national and state/territory legislation, and in other program-specific policies, would be replaced by new access and use arrangements under the proposed *Data Sharing and Release Act* (enabled in the states and territories under the Australian Government's constitutional powers). This would ensure ongoing dataset maintenance as a national asset, streamline access to the dataset and, where relevant, enable linkage to other datasets. As indicated above, current provisions in federal and jurisdictional privacy legislation covering the disclosure and use of personal information (including the need to obtain consent) would be overridden by the new Act, but access to this type of data would be strictly controlled.

The process to designate datasets as NIDs would allow the states and territories (and private sector entities) to volunteer or opt in to having their datasets included in the national system (but they would not be compelled to do so). Where states and territories choose to have datasets designated as NIDs, separate state and territory legislation may be required to enable release of data held by state government bodies (including government early childhood education and care services, schools and education departments). Designation would allow state and territory datasets to be curated and accessible under the new Act, and more readily allow linkage of these datasets with other data. A system of identifying and funding ongoing maintenance of NIDs would create consensus and co-operation between sectors and between the Commonwealth and the states and territories.

The suite of datasets developed under the new system would, under the discretion of an Accredited Release Authority (ARA), either be released publicly (in the case of low risk data) or shared with a group of trusted users that would include all Australian, state and territory government agencies. In the case of higher risk identifiable data, access would be limited to a narrower group of trusted users subject to strict data security arrangements. In an education context, adoption of the Commission's proposals would potentially see the Australian Curriculum, Assessment and Reporting Authority accredited as an ARA for the education sector (chapter 8). This system would effectively transfer approval decisions from initial data custodians to the ARA and (where relevant) ethics committees.

Key features of the proposed access arrangements to safeguard against the misuse of high risk identifiable datasets (including education collections) involve: access being granted on a project-by-project basis to approved trusted users for a pre-determined list of public interest purposes; existing exceptions to obtaining consent extended beyond health to public interest research generally; access to occur in a specified secure computing environment and significant adverse consequences for inappropriate use of datasets by trusted users.

Source: PC (2016a).

5.1 Privacy regulation impedes access to education data

In considering privacy issues, a distinction needs to be drawn between administrative, survey and other data collections that contain personal information that can be used to identify an individual (including, but not limited to, name, address, date of birth) and data collections that do not contain such information (de-identified or non-identified data). Privacy laws do not apply to de-identified data.¹⁰

Moreover, while certain research purposes are suited to using de-identified data, for others (particularly those based on linked datasets) the inclusion of personal information may be needed. For example, some participants argued that datasets linked using de-identified data suffered from data quality problems. According to the Telethon Kids Institute (sub. 15, p. 7) (an organisation with decades of experience in data linkage activities):

... a statistical linkage key [SLK] is not sufficient to enable good quality, robust linkage. Data should include as much information as possible to inform (including name, address and date of birth) as there are often errors in point of collection, leading to incorrect SLKs. These errors lead to incorrect or missing matches when linking data. Having full identifying information reduces the likelihood of this error. There are many ways that linkage can be achieved, using identifying information that protects individual privacy.

But this view was not universal among participants with some commenting that sophisticated statistical linkage methods can result in a very high proportion of matched records.

Issues of data quality aside, there is a separate issue of whether identified or ‘granular’ data are required in situations where insights into individual school and student improvement are needed to guide targeted interventions. This need for identified data to underpin targeted research and policy interventions was supported by a number of participants, including the Catholic Education Diocese of Parramatta (sub. 23), Goodstart Early Learning (sub. 70) and the Grattan Institute (sub. 61). While the Australian Government Department of Education and Training (sub. 68, p. 4) did not specifically argue for the use of identified data it did refer to the need to support and monitor the progress of individual students:

The purpose of an education evidence base is to support and evaluate progress towards national education objectives as well as progress for an individual child or student. This is achieved through monitoring of educational outcomes for children and students to better inform policy and programme development and evaluation.

Accordingly, in certain circumstances access to personal information may be preferred by education researchers, policy and service delivery agencies to the de-identified alternative. It may therefore be appropriate to provide scope for such disclosure provided that the

¹⁰ The Australian Curriculum, Assessment and Reporting Authority (sub. 62) suggested that privacy laws remain key obstacles to data sharing even if data are de-identified because of the potential for re-identification of individual students.

legitimate privacy interests of individuals are safeguarded (discussed below). This could involve a two-tiered disclosure regime as suggested by The Smith Family (sub. 60, p. 12):

In addition to the data needing to be granular, there is also the need for it to be able to be aggregated. For research and evaluation purposes, ideally data is available at the unit record level (de-identified), with sufficient information such as SES [socioeconomic status], age, gender, location etc to enable the data to be analysed in different ways depending on the research or evaluation question.

But some participants were opposed to disclosure of personal information on the grounds that an individual's right to privacy was paramount. The School of Education and Professional Studies at Griffith University (sub. 76, p. 4) used the processes governing medical research as a benchmark:

... we strongly suggest that ethical protocols – for example, similar to human research ethics protocols – are established. For example, these protocols should ensure that aggregated, de-identified data only be used to ensure privacy. Similarly, permission protocols would need to be established, including providing individuals with information about the potential ownership and use of their data.

This position invites a question about community attitudes towards privacy issues in the context of using personal information to conduct public interest research. Researchers from the Australian Institute of Family Studies (sub. 73) presented evidence on consent rates obtained for a cross-section of administrative, transactional, census and performance datasets that were linked to the *Longitudinal Study of Australian Children* (table 5.1). As shown, consent rates exceeded 90 per cent for all health and education datasets. According to Edwards and Siphthorp (sub. 73, p. 5):

This provides suggestive evidence that the general population, or at least the general population of parents of children, support the linkage of administrative data for research purposes.

Comparable consent rates were reported by the Murdoch Childrens Research Institute (MCRI) in the context of opt-out mechanisms used in nominated health and education data collections:

Information provisions with opt-out approaches provide a mechanism for consent for utilisation of data. MCRI has significant experience in implementing such processes in the Victorian Newborn Screening Program which achieves >95% consent for use in research. In addition, the AEDC data are collected through opt-out with similar consent rates. (sub. DR92, p. 5)

The considerable resources (in terms of time and financial cost) required to obtain informed consent need to be viewed in this light, especially when privacy legislation does not mandate an absolute standard of informed consent.

Table 5.1 Consent rates for data linked to Longitudinal Study of Australian Children (LSAC)

<i>Linked data</i>	<i>LSAC wave</i>	<i>Consent rate</i>
Medicare Benefits Schedule	1	97.0
Pharmaceutical Benefits Scheme	1	97.0
Australian Child Immunisation Register	1	97.0
Medicare Benefits Schedule	6	93.7
Pharmaceutical Benefits Scheme	6	92.3
Australian Early Development Census ^a	4	95.5
NAPLAN ^b	3, 4	95.4
NAPLAN ^a	4	95.5

^a LSAC birth cohort (born 2004). ^b LSAC kindergarten cohort (born 2000).

Source: Edwards and Siphthorp (sub. 73).

Federal privacy legislation

Australia’s federated system of government provides scope for general privacy protection laws to be enacted at different levels of government. Most jurisdictions use such general laws to regulate the use and disclosure of personal information. These laws also operate alongside statutes that regulate specific government services (including the provision of higher education) as well as contractual or common law duties. As noted by the Office of the Australian Information Commissioner (OAIC) (sub. 69, p. 6):

While the Privacy Act provides an overarching framework for how personal information should be handled, additional legal obligations apply to some types of data and may have implications for information sharing and access. This includes enabling legislation for government agencies which may expressly or impliedly authorise or limit the sharing of information. Data sets may also be subject to confidentiality provisions, contractual obligations or to equitable obligations based in the common law (such as an obligation to maintain confidence).

As a general rule, where there is overlap between general privacy and other legislation the highest privacy standard applies. But the implication of different and often overlapping regulatory provisions is that ‘access to data can be restricted even where the applicable regulatory regime does not prevent the sharing of personal information’ (OAIC, sub. 69, p. 6).

Moreover, where there are differences in the legislative drafting of laws that provide for the collection of substantially the same or related education data, this results in segmented data access, greater uncertainty and a more risk averse approach to data sharing. An example is provided in early childhood collection where some data are collected (and their use regulated) under family assistance law while other data are collected (and their use regulated) under the education law (discussed below). The result is that the Australian

Government is prevented from sharing early childhood data it collects under the family assistance law with state and territory governments.

The Privacy Act

Unlike privacy regimes in some other countries, privacy law in Australia does not strictly rely on the notion of individual consent (in all its forms). Rather, Australia's statutory privacy regimes allow for disclosure of personal information in specified circumstances (those typically associated with public interest objectives). As such, privacy law in Australia can be considered less restrictive than in the regimes operating in many other countries (including Europe and the United States).

The main piece of federal legislation is the *Privacy Act 1988* (Cwlth). The Act regulates the handling of personal information by Australian Government agencies, large private organisations (and some small businesses) and all private health service providers (OAIC 2016).¹¹ The Act covers the collection, storage, security, use, disclosure and destruction of personal information and contains a list of principles, the Australian Privacy Principles (APPs), that set out standards, rights and obligations for the handling of personal information (including sensitive information) that apply to covered entities (box 5.3).¹²

The Act does not apply to state or territory authorities. A key element of the APPs is a requirement that entities to which the law applies (covered entities) must not (subject to certain exceptions) use or disclose information collected from an individual for a purpose other than that for which the information was primarily collected (OAIC 2014b).¹³

¹¹ This coverage has direct relevance to education providers as non-government childcare centres are treated as providers of health services and hold health information (even if providing a health service is not their primary activity) and are therefore subject to the federal privacy law. And in a context relevant to education research, universities created under federal statutes are also covered by the federal Privacy Act. In addition, non-government schools (Catholic system and Independent) are subject to the federal privacy law, while state public schools and state universities are subject to jurisdictional privacy laws.

¹² Those with a turnover greater than \$3 million.

¹³ The Act applies to personal information that has been collected or held by a covered entity. Hence, the onus of responsibility to ensure the appropriate management of personal information lies with the entity rather than the body that the information may be used by or disclosed to.

Box 5.3 Australian Privacy Principles (APPs)

The APPs replaced the National Privacy Principles and Information Privacy Principles on 12 March 2014. The 13 APPs from Schedule 1 of the *Privacy Amendment (Enhancing Privacy Protection) Act 2012* (Cwlth), which amends the *Privacy Act 1988* (Cwlth), are listed below.

1. Open and transparent management of personal information
2. Anonymity and pseudonymity
3. Collection of personal solicited information
4. Dealing with unsolicited personal information
5. Notification of the collection of personal information
6. Use or disclosure of personal information
7. Direct marketing
8. Cross-border disclosure of personal information
9. Adoption, use or disclosure of government related identifiers
10. Quality of personal information
11. Security of personal information
12. Access to personal information
13. Correction of personal information.

Source: OAIC (2014b).

Privacy Act exceptions for health research

The Act provides exceptions to the general privacy provisions for permitted health situations (including the conduct of medical research). Subject to the application of detailed guidelines dealing with privacy matters, health research proposals seeking to use identifiable personal or health information *without consent* may be approved by a Human Research Ethics Committee (HREC) (box 5.4) if the HREC considers it necessary to use identified or potentially identifiable data, and that it is reasonable to proceed without consent (Adams and Allen 2014). The HREC must also take into account whether the public interest in the research substantially outweighs the public interest in maintaining privacy.

Importantly, the governance arrangements contained in the *National Statement on Ethical Conduct in Human Research 2007* (the National Statement) include requirements that where an HREC rejects a proposal, the researcher must be notified of the reasons and that formal procedures for handling complaints about the review process be established. This is in stark contrast to the accountability arrangements for health data custodians (discussed below).

Box 5.4 Human Research Ethics Committees

Human Research Ethics Committees (HRECs) play a central role in the Australian system of ethical oversight of research involving humans. HRECs review research proposals involving human participants to ensure that the proposals are ethically acceptable and in accordance with relevant standards and guidelines. There are more than 200 HRECs in institutions and organisations including universities, hospitals, government health and other departments, research institutes, and welfare services across Australia. Many other countries have similar systems.

In undertaking this role, HRECs are guided by relevant standards including those in the *National Statement on Ethical Conduct in Human Research 2007* (the National Statement) issued by the National Health and Medical Research Council. The National Statement sets out the requirements for the composition of a HREC and the relevant ethical principles and values by which research should be designed and conducted and to which HRECs should refer when reviewing research proposals. It also identifies requirements and responsibilities for:

- institutions/organisations in establishing HRECs
- researchers in submitting research proposals to HRECs
- HRECs in considering and reaching decisions regarding these proposals and in monitoring the conduct of approved research.

In undertaking ethical assessment reviews of research proposals, HRECs consider the protection of privacy of those participating in research or data used in research. HRECs must first consider which legislation might apply to research proposals, that is Commonwealth or state/territory legislation, bearing in mind that in some cases more than one Act will apply.

Individual consent must either be obtained or waived (by the HREC), or an opt-out approach implemented, before a research proposal can be approved. According to the National Statement, the opt-out approach is unlikely to constitute consent where information is deemed sensitive. Hence, where it is impracticable to obtain an individual's explicit consent and the purpose of the research cannot be served by using de-identified data, HRECs then consider whether a research proposal conforms to the relevant privacy principles. Where necessary, guidelines under s. 95 of the *Privacy Act 1988* (Cwlth) that apply to public sector agencies, or those under s. 95A of the same Act that relate to private sector organisations, or any other relevant guidelines, are applied.

Conditions for determining whether consent can be waived under s. 95 or s. 95A guidelines by the HREC reflect the nature of medical research and are comprehensive. They include that:

- the research involves low risk of harm to participants
- the benefits from the research justify the risks of harm
- it is impracticable to obtain consent (for example, due to the quantity or age of records)
- there is no known or likely reason that a participant would not consent if asked
- there is sufficient protection of privacy
- there is an adequate plan to protect data confidentiality
- there is an adequate plan to make results available to participants
- the possibility of commercial exploitation of the data would not deprive participants of financial benefits, and the waiver is not prohibited by state, federal or international law.

Sources: NHMRC (2016); NHMRC, ARC and AVCC (2015).

In the case of medical research, guidelines described in the National Statement and approved by the Australian Information Commissioner set out the conditions under which a HREC may approve the use of personal information. Ethical approval is a significant component of medical research practice and culture and this is reflected in the detailed and strict guidance provided in the National Statement. Researchers have a powerful incentive to comply because ethical approval is a pre-requisite for:

- accessing data held by custodians
- research funding support by the NHMRC
- publication in medical journals
- ultimately, the introduction of new medical practices or interventions.

However, while the National Statement imposes strict requirements on ethics committees, it places no obligations on data custodians to release data containing personal information. In the words of Adams and Allen (2014, p. 965):

HREC approval is a prerequisite for release of government datasets to researchers, but does not guarantee that government data custodians will release information. The section 95 Guidelines expressly provide that the data custodian may always decline the use or disclosure of health information, even when the research has been approved by an HREC. This is the case even where the HREC is associated with the same agency or government portfolio as the data custodian.

In the Draft Report the Commission commented that consideration of extending the current exception in the Privacy Act to other forms of public interest research (including education research) needed to be cognisant of how that exception works in practice in the health area. In particular, this would inform whether the current arrangements in health research need to be refined for use in an extended exception. Toward that end the Commission invited feedback from participants on the operation of the s. 95 and s. 95A guidelines in health research.

The Commission's attention was subsequently drawn to work by Adams and Allen (2014). Referencing a suite of earlier research, the authors commented that despite the legal, technological and ethical support for release of data for medical research, there was evidence from at least some researchers that health data custodians were refusing to provide access to data or, more commonly, that data requests were met with intractable delays. While the authors acknowledged the difficulty of gauging the extent of this problem, they also said the section 95 guidelines do not of themselves guarantee the release of personal information for research purposes in the health area. The authors went on to argue that the creation of a conditional right of access to health data, based in part on the underlying principles of the *Freedom of Information Act*, would deliver greater transparency, consistency, fairness and timeliness in decision making. This proposal is discussed in greater detail below.

Alternative avenues to access personal information

In addition to specific health-related exceptions, the Act (under APP 6) also allows personal information to be used or disclosed for a secondary purpose where any of the following exceptions apply:

- an individual has consented to the use or disclosure
- an individual would reasonably expect the use or disclosure
- use or disclosure is required or authorised by law
- permitted general situations exist (such as preventing threats to life, health or safety)
- a permitted health situation exists.

This suite of allowable secondary purpose tests affords data custodians considerable scope to use or disclose personal information (without the need for data to be de-identified). In particular, the reasonable expectations test covers secondary purpose use and disclosure (for data compilation or research) for both sensitive and non-sensitive information. The Act describes the test as an objective one that has regard to what a reasonable person, *who is properly informed* (emphasis added), would expect in the circumstances. This is a question of fact in each individual case and the APP entity has an onus of responsibility to justify its conduct (APP 6 — Use or disclosure of personal information).

The reasonable expectations test is supported and expanded by other privacy principles, including APP 5 which provides that reasonable steps must be taken to notify or raise awareness of an individual about the purposes of collecting personal information and usual disclosure practices. The OAIC (sub. 69, p. 9) noted that:

A privacy notice that sets out a range of likely secondary uses or disclosures may assist an APP entity in establishing an individual's consent, or reasonable expectation of, those uses or disclosures.

A practical application of the notification provision is in the *Australian Early Development Census* (AEDC). In co-managing the collection, the Australian Government Department of Education and Training (DET) provides notification to parents (through a privacy statement) about how the personal information provided about their children will be used. Along with a range of de-identified disclosure purposes, parents are notified that personal information contained in the AEDC data may be disclosed for data linkage and research purposes (Australian Government 2015).¹⁴

The Smith Family applauded the granular nature of the AEDC data collection for enabling targeted education interventions:

The availability of [AEDC] data at multiple levels, including the community level, and over multiple years, means that the data can be used to target the particular needs of children in a local area. (sub. 60, p. 12)

¹⁴ Parents are given the opportunity to opt out of the AEDC should they choose.

This example highlights the value of incorporating tailored notification features in either the original (or refreshed) design parameters of administrative, survey, census and other data collections. Without this feature, cumbersome, expensive and inefficient consent procedures may need to be pursued. This is the present reality facing researchers who wish to access education data from a range of sources (discussed below).

In the Draft Report the Commission recommended that formal consent and notification procedures should be introduced at the initial point of education data collection. A number of participants supported this recommendation with Goodstart Early Learning commenting:

Goodstart supports the recommendation that instruments collecting educational data should include informed consent and that they should be provided on an opt-out basis, similar to the operation of section 95 guidelines in health research. This would [enable] researchers, policy makers and service providers to gain a more holistic understanding of the various impacts and circumstances which impact on a person's education journey. Often current practice and caution over privacy concerns, despite the de-identified nature of many data sets, hinder effective use of existing data collections. A standardised consent process to use and disclose personal information at the initial point of collection is also likely to minimise the regulatory burden associated with capturing and handling data as there would be a consistent process across educational institutions. (sub. DR135, p. 7)

The Murdoch Childrens Research Institute gave qualified support by adding that it was not always appropriate to incorporate formal consent and notification procedures when collecting education data. They also cautioned that public support for use of data was conditional on the intended purpose and nature of the researcher.

Agencies need to ensure they implement consent carefully, taking into consideration the population's comfort and expectations for use of their data. Evidence from our own work and others indicates that the majority of the population expects use of their data for research to improve policies and services. However, they trust and are more comfortable with independent research organisations (universities and independent research institutes) to complete such work. (sub. DR92, p. 5)

The OAIC welcomed the recommendation:

... requiring entities to obtain an individual's consent at the time of collection for the use of their personal information for research purposes is privacy enhancing, as it gives individuals greater control over their personal information. Seeking consent at the time of collection may also provide time and cost efficiencies for researchers, as it can help to avoid the subsequent need to pursue cumbersome, expensive and inefficient consent procedures for additional secondary uses or disclosures. (sub. DR140, p. 6)

But in doing so the OAIC also highlighted the need to ensure consent was voluntary, current and specific (rather than enduring). It warned against a bundled consent approach where individuals are not given the opportunity to choose which collections, uses and disclosures they agree to and also against assuming that consent given at a particular time and in particular circumstances constituted enduring consent. The OAIC went on to suggest that effective notification procedures that, inter alia, supported the exercise of

meaningful consent would be aided by the adoption and application of technological developments:

Advances in technology present opportunities for more dynamic, multi-layered and user centric privacy policies and notices. Innovative approaches to privacy notices include ‘just-in-time’ notices, video notices and privacy dashboards and multi-layered privacy policies to assist with readability and navigability. (sub. DR140, p. 7)

The Commission notes that features of different data collections (including survey, census or regular performance testing) will determine the most appropriate method of obtaining meaningful consent. This also means that a tailored approach to consent will be warranted. For example, existing collections such as the triennial AEDC utilise a detailed privacy statement identifying the potential primary and secondary uses of the data (including personal information) combined with an opt-out mechanism. But this approach may not be appropriate for ongoing collections such as those involving biannual student academic reports.

Ultimately, the Commission considers that the most appropriate means of dealing with consent issues (including questions around duration) should be developed in consultation with jurisdictional privacy and information agencies. This would go some way toward addressing the concerns put by the Queensland Government (sub. DR142) about the validity of obtaining ongoing consent when the research project and entity were not known in advance. Accordingly, the Commission has amended its Draft Recommendation so that it encompasses consistency with jurisdictional privacy principles relevant to obtaining meaningful consent.

RECOMMENDATION 5.1

In circumstances where formal consent and notification processes would allow personal information to be used and disclosed for education research, agencies responsible for education data collections should amend their processes for collecting personal information from parents/guardians to incorporate formal consent and notification procedures at the initial point of collection.

That said, notification options are not always available, particularly where legislation explicitly prohibits the disclosure of personal information in any circumstance (including where consent is obtained). For example, there are much stricter information use and disclosure requirements for information collected on children with disability under the *Nationally Consistent Collection of Data on School Students with Disability* (NCCD). This appears to reflect community and/or cultural sensitivities about protecting personal information for particular student cohorts.

The *Australian Education Regulation 2013* states that collected information must not explicitly identify a student who has a disability; has an Indigenous background; or is participating in distance education. The DET (as the data custodian) has issued a public

information notice advising parents that only de-identified data will be used in the preparation of reports, briefing materials and as input to policy development (including funding). The notice specifically precludes the disclosure of personal information to third parties. But this also means that linkage keys cannot be constructed for that data (except by the data custodian) and accordingly, NCCD (and other) data cannot be used to target policy interventions to individual students who are in the greatest need of such assistance.

Despite the strict NCCD data safeguards (ensuring only de-identified data can be disclosed), some participants were still critical of the ‘passive consent’ approach to privacy adopted under the NCCD and called for more information to be provided to parents. Children and Young People with Disability Australia (CYDA) (sub. 66, p. 13) said:

CYDA has been informed that many families of students with disability were not aware of the data collection, nor their child’s involvement. This is despite the fact that the data was collected in 100% of schools in 2015, suggesting that inadequate information has been provided to families. CYDA regards this process as highly problematic.

The Independent Schools Council of Australia (ISCA) also highlighted the importance of improving parental understanding of how the information they provide will be used.

ISCA supports further refinement of the privacy notices provided to parents and guardians regarding the formal consent and notification procedures regarding the use and disclosure of personal information at the initial point of collection. ISCA has previously raised concerns that current privacy notices may not provide enough information to parents/guardians regarding the actual uses of data collected by schools.

For example, it is highly likely that parents are not aware that the parental background data they provide on enrolment forms is used for funding. These data are used to calculate the low SES loading component of the current funding model via the use of socio-educational advantage (SEA) quartiles calculated by the Australian Curriculum, Assessment and Reporting Authority (ACARA) for the purposes of creating the index of community socio-educational advantage (ICSEA). (sub. DR138, p. 7)

The National Catholic Education Commission (NCEC) concurred and noted that it was uncertain whether parents had full understanding of what their consent allowed even under current arrangements:

The NCEC has argued that in collections such as NAPLAN Online, parents should be provided with more information than is currently provided through standard collection notices and that this information should be explicit as to who is collecting the data and for what purpose(s), where it will be stored and for how long. Furthermore such disclosures should be provided as close to the collection event as possible. (sub. DR106, p. 9)

From a researcher’s perspective, the Queensland University of Technology Faculty of Education (sub. 19, pp. 13–14) commented that ‘opt-out’ approaches were more effective mechanisms for gaining parental agreement:

We propose that if the research is in the national interest for improving educational outcomes, and students are required only to engage in activities that would be considered everyday practice within schools (e.g., pen and pencil survey, interaction with teaching staff or learning

materials), then opt-out consent is highly appropriate, low-risk and beneficial. The opt-out option would reduce the potential for bias many-fold whereas any opt-in process potentially establishes bias from the outset.

The discussion above highlights the piecemeal applicability of existing avenues to allow data disclosure under the federal privacy law. These avenues are either not well understood or cannot be universally applied. And as noted by DET, other legislative arrangements place stricter limits on disclosure than general privacy laws. Several submissions to this inquiry indicated that the general relief granted by the federal privacy law is confusing and hence is not being embraced by data custodians and ethics committees. The Tasmanian Government (sub. 75, p. 5) suggested that the problem lay in the wording of the relevant privacy Acts.

Tasmania would support ‘plain English’ interpretations of privacy legislation to assist decision makers.

The OAIC (sub. 69, p. 1) provided a broader insight into the underlying drivers:

Privacy, however, is often named as the primary barrier to sharing or accessing personal information from and across government agencies – that is not correct. Privacy rather than preventing the sharing of personal information places important limitations around the circumstances under which it can be collected, used and disclosed. Instead, and as identified in the Issues Paper, impediments to appropriate information sharing often include a general reluctance to disclose personal information due to misunderstandings of privacy law, secrecy issues and a risk averse culture within agencies.

Extending the reach of the s. 95 and s. 95A exception to public interest research

This confusion raises a valid question about whether the s. 95 and s. 95A exception (and the associated conditions requiring public interest consideration of relevant privacy protection guidelines by the Information Commissioner) for health-related disclosure should be broadened. It could cover other activities that are conducted in the public interest and thereby remove any ambiguity about public interest exceptions (and potentially the need for notification requirements). The rationale for restricting use or disclosure exceptions to health-related research is not clear. Submissions to this inquiry even noted that privacy risks in education research are lower than those in health. Speech Pathology Australia (sub. 35, p. 15) said:

There are risks associated with the linkage of data at individual (and cohort) level[s] of data – particularly if proposals are to link educational data with health, employment, social services or justice data ... Of course, appropriate privacy safeguards need to be put in place to ensure that linked data is used in an appropriate way. However barriers to privacy concerns have been overcome within the health sector (where arguably, the stakes are considerably higher and there are very strict health privacy legislative requirements).

In a 2008 review of Australia’s privacy laws the Australian Law Reform Commission (ALRC) recommended that s. 95 and s. 95A of the Privacy Act be extended beyond health

to include the use of personal information in all forms of human research. Citing wide ranging (but not universal) support from submissions, the ALRC (2008, p. 2164) concluded:

There is no in-principle reason to limit the arrangements for research under the *Privacy Act* to health and medical research. The ALRC notes that the research exceptions in other jurisdictions, such as the United Kingdom, Canada and New Zealand, are expressed in broad terms.

The Government subsequently accepted the recommendation to extend the existing arrangements for health research to all forms of human research on the basis that:

Forms of human research beyond those relating to health and medical research can serve important public interests. Provided that appropriate protections are adopted, the Privacy Act should permit the collection, use and disclosure of personal information without consent for the purpose of important human research in certain circumstances.

Appropriate protections should include:

- that the exception may only be relied upon where consent is impracticable;
- the activity is subject to institutional ethical oversight of research proposals; and
- the public interest in a research proposal substantially outweighs the public interest in protecting privacy. (Australian Government 2009, p. 139)

However, the Privacy Act was not subsequently amended to implement the recommended change. The Commission has been unable to determine the basis for this outcome but it notes that the resulting confusion for education data stakeholders (for example, data custodians and ethics committees) may be undermining data sharing across and within jurisdictions. The OAIC (sub. DR140, p. 8) supported revisiting the s. 95 and s. 95A provisions but cautioned that any broadening would need to balance the potential community benefits, the potential to adversely affect privacy interests and the potential impact on community trust in the use of data for research.

The OAIC also emphasised that existing s. 95 and s. 95A obligations (including whether personal information is reasonably necessary to achieve the research purpose, whether de-identified information could be used instead and whether obtaining consent is reasonable or practical) should be imposed on a broader exception. In this context, the OAIC suggested the operation of public interest exceptions in jurisdictional privacy laws such as in New South Wales could be informative. The submission by the New South Wales Government commented that recent amendments to the *Privacy and Personal Information Act 1988* have ‘... sought to balance policy objectives to protect personal information and enable research and evaluation in sectors including education and health...’ (sub. DR145, p. 5). In addition to obligations consistent with the s. 95 and s. 95A obligations mentioned above, the amendments also include a requirement that the collection, use or disclosure of information accords with guidelines, if any, issued by the Privacy Commissioner.

Extending the reach of s. 95 and s. 95A was also supported by the Australian Curriculum, Assessment and Reporting Authority (ACARA) (sub. 62, p. 5):

ACARA would support exploration of establishing an exception under the Privacy Act relating to education data research that is equivalent to section 95 of the Act for health data, subject to appropriate checks and balances being put into place.

The checks and balances referred to by ACARA would include independent ethical research guidelines approved by the OAIC. The School of Education and Professional Studies at Griffith University (sub. 76, p. 5) suggested the ethical framework used for medical research should guide information management in the education space:

Governance should ensure that current national ethics frameworks being applied in other contexts – such as human research ethics – are drawn upon to inform improved governance through well-defined accountability and responsibility, transparency and oversight of the quality and availability of data, access protocols, procedures, and dispute resolution mechanisms.

However, as noted above, the operation of those guidelines does not guarantee access to personal information without obtaining an individual's consent. The Commission's Draft Report subsequently recommended that the exception provided to health and medical research under the Privacy Act be broadened to cover public interest research more generally. While expressing support for extending the scope of the current exception, the submission by Early Childhood Australia (sub. DR154, p. 4) cautioned against adopting a narrow definition of public interest research:

... "public interest research" should not mean only research in an academic sense, but include analysis for example by service providers or sectors who want to understand the populations they serve, and improve their performance. We support a process of scrutiny and approval for such use.

The Mitchell Institute (sub. DR103, p. 3) made a similar point and listed the range of stakeholders with an interest in accessing existing education data:

The Mitchell Institute notes, however, that it is not only researchers who seek or benefit from access to existing data. ECEC centres, schools, community sector organisations, peak bodies, policy advocates and others are also stakeholders in education data, but generally have few resources and limited capacity to access data relevant to their needs. For example, a primary school that wanted access to linked perinatal, AEDC and NAPLAN data – to better understand their cohort of children and to track the impact they were having on their student's success in high school – would be unlikely to have the resources to commission a research project, and should not have to.

There are some core elements of existing administrative and survey data that should be systematically made available to enable better local decision-making, to track impact on an ongoing basis, and foster more robust policy conversations.

Others raised concerns about extending the s. 95 and s. 95A guidelines to broader public interest research because of the potential risks of stigmatising particular schools and communities. In particular, the Australian Primary Principals Association (APPA) said:

APPA is concerned about the move to have data more accessible for public interest research. The concerns include the possible identification of communities that could lead to negative labelling; that the research being undertaken is for the benefit of education practice and policy; and, the politicising of school education based on selective data or negatively biased reporting in the media. (sub. DR89, p. 4)

In principle, the Commission considers that access to education or other data containing personal information (for a secondary purpose) should be based solely on public interest grounds where the benefits of access are balanced against appropriate protection of privacy and personal information. The Commission has set out such a framework in the *Data Availability and Use Inquiry* (box 5.2).

RECOMMENDATION 5.2

The Australian Government should amend the *Privacy Act 1998* (Cwlth) to extend the exception relating to the collection, use or disclosure of personal information in the area of health and medical research to cover public interest research more generally.

State and territory regulation of privacy

In addition to the national privacy law, six of Australia's states and territories have general privacy laws that cover the handling of personal information (table 5.2).

The exceptions are South Australia, which uses administrative powers to regulate privacy, and Western Australia, which does not have formal privacy regulation but regulates education data through education and related Acts (discussed in section 5.2). State and territory legislation creates information privacy requirements similar to those under the Privacy Act, with application to government schools, state and territory government agencies, as well as (variously) local councils, government-owned corporations and universities (created under state statutes).

Jurisdictional privacy laws share common features including guidance-based information principles (similar to the APPs in the federal privacy law) that cover the collection, use, storage, access and disclosure (including through trans-border flows) of information, and apply to all public sector agencies. While the laws generally prohibit the disclosure of information to third parties, many allow general public interest exemptions (including for research purposes) subject to conditions (discussed below).

Table 5.2 Features of jurisdictional privacy regulation

<i>Jurisdiction</i>	<i>Legislation or administrative instruction</i>	<i>Public interest research exception available</i>	<i>Exception relies on impracticality of obtaining consent</i>	<i>Interstate transfer of personal information allowed</i>
New South Wales	Legislated	Yes	Yes	Yes
Victoria	Legislated	Yes	Yes	Yes
Queensland	Legislated	Yes	Yes	Yes
South Australia	Administrative	No	..	No
Western Australia	Neither	No	..	No
Tasmania	Legislated	Yes	Yes	Yes
Northern Territory	Legislated	Yes	Yes	Yes
ACT	Legislated	No	..	No

.. Not applicable.

Sources: Privacy and Personal Information Protection Act 1998 (NSW); Privacy and Data Protection Act 2014 (Vic); Information Privacy Act 2009 (Qld); Information Privacy Principles 2013 (SA); Personal Information Protection Act 2004 (Tas); Information Act 2002 (NT); Information Privacy Act 2014 (ACT).

Importantly, several jurisdictions specifically allow sharing of data with other jurisdictions provided the recipient is subject to the same privacy principles as the originating jurisdiction. This effectively means mutual recognition of privacy laws in ‘like’ jurisdictions. By extension, jurisdictions that do not have formal privacy laws are (at least technically) impeded from accessing and using personal information collected by other jurisdictions.

A recent example involves an attempted partnership project between South Australia, Western Australia and the Northern Territory, which sought to use student-level attendance data to track children in remote areas moving between the three jurisdictions (box 5.5). Highlighting the nature of the impediments, the Independent Schools Council of Australia submitted:

Privacy issues also arise in the case of data linkage. For example the Tri-Borders Project was intended to track and provide continuity of learning for remote Indigenous students across all school sectors in WA, SA and NT. However, issues arose with jurisdictional privacy legislation including the types of data which could and could not be shared. This has impacted on the overall effectiveness of the project for tracking a particularly disadvantaged cohort and it is unlikely that in the current context it will be able to be extended nationally. (sub. DR138, p. 6)

Box 5.5 An example of cross-jurisdictional data sharing challenges

An example of the challenges faced in sharing education data between school systems and jurisdictions with inconsistent privacy legislation is the *Trans-Border Attendance Strategy*. The strategy was funded by the Education Council to enable the sharing of enrolment information for highly mobile students across the state borders of South Australia, Western Australia and the Northern Territory. The Strategy commenced as a pilot in 2009 and included 45 South Australian, Western Australian and Northern Territory remote schools to address the issue of absenteeism and significant mobility amongst Indigenous students. The Strategy gradually progressed to include 399 public, Catholic and Independent schools in 2013.

A key feature of the Strategy was an information technology platform — the *Central Schools System* — which consolidated and merged attendance data from participating systems. Through the use of the platform, schools were able to share attendance, enrolment and learning information across education sectors (public, Catholic and Independent) and across jurisdictions. As a result of the availability of this information, school staff could determine (on or before student arrival) the student's enrolment and attendance history, and access other information necessary to progress individual learning or develop behaviour plans for transient students.

The project initially drew considerable interest from other jurisdictions seeking to be involved. However, the project was hampered by issues with uptake and usability of the data platform by schools. These issues were compounded by legislative privacy barriers in some jurisdictions in relation to data sharing. Expansion of the strategy has been halted and ongoing participation of existing jurisdictions remains uncertain.

Sources: NT Government (sub. 77); WADET (2016).

Specific exceptions in state and territory privacy legislation

In contrast to federal privacy law, which provides a specific exception to disclosure obligations for health (subject to the conditions described earlier), several jurisdictions allow broader exceptions to privacy protection principles. In particular, New South Wales, Victoria, Queensland, Tasmania and the Northern Territory variously provide for the use and disclosure of personal information conditional on:¹⁵

- it being necessary or reasonably necessary for the purpose of research, or the compilation or analysis of statistics that is in the public interest
- use or disclosure not involving the publication of any personal information in a form that identifies an individual
- the impracticality of obtaining consent of individuals before disclosure.

Notably, in those jurisdictions where public interest exceptions are available, the conditions for allowing the exception only partly mirror those provided under s. 95 and s. 95A of the federal privacy law. Specifically, Victoria, Queensland and Tasmania delegate authority to the respective Minister, Information and/or Privacy Commissioner to determine whether the public interest in waiving compliance with jurisdictional privacy

¹⁵ These jurisdictions all use privacy principles which are substantially similar to the federal privacy law.

principles outweighs the public interest in complying with those principles. New South Wales and the Northern Territory, on the other hand, only delegate authority to the respective Information or Privacy Commissioner to issue guidelines or a code of practice dealing with the disclosure of personal information.

The privacy legislation in these jurisdictions also differs from the federal law in that they allow the transfer of personal information to a recipient outside the jurisdiction if that recipient is subject to substantially similar information privacy principles as those operating in the source jurisdiction. The Victorian legislation provides an example:

An organisation may transfer personal information about an individual to someone (other than the organisation or the individual) who is outside Victoria only if ... the organisation reasonably believes that the recipient of the information is subject to a law, binding scheme or contract which effectively upholds principles for fair handling of the information that are substantially similar to the Information Privacy Principles ... (*Privacy and Data Protection Act 2014*, sch. 1)

As mentioned above, this is effectively a form of mutual recognition of jurisdictional privacy laws (in certain jurisdictions) but the Commission is not aware of any examples of inter-jurisdictional data transfers using this provision.

In the context of the Commission's discussion regarding a public interest research exception, it is the Commission's view that the ACT, which currently does not have such a provision, should enact such an exception to their law. South Australia and Western Australia should ensure their privacy arrangements reflect a public interest research exception. Those participants commenting on this issue in the draft report supported it. The OAIC said:

While ultimately a matter for each jurisdiction, I support efforts to harmonise privacy regulation across the various Australian jurisdictions. In my view, a nationally consistent or uniform approach to public interest research exceptions would help to avoid further fragmentation of privacy rights and obligations between Australian privacy jurisdictions, and improve cross jurisdictional data flows. (sub. DR140, p. 9)

RECOMMENDATION 5.3

The ACT Government should enact in its privacy law an exception to cover public interest research. In Western Australia and South Australia where there is not a legislated privacy regime, their privacy arrangements should reflect a similar exception for public interest research.

Other state and territory treatment of personal information

Privacy regulations in Western Australia, South Australia and the ACT do not permit the use and disclosure of personal information for any research or related purpose. While the legislation in the ACT substantially mirrors the provisions of the federal Privacy Act, it diverges in one important respect in making no provision for exceptions to the collection,

use and disclosure provisions of personal information in the case of health (or any other) research.

Although South Australia does not have specific privacy legislation, the South Australian Government has issued an administrative instruction requiring its agencies to comply with a set of Information Privacy Principles (IPPs) (SADPC 2013). While the South Australian IPPs list allowable exceptions to the use and disclosure of personal information for purposes other than the primary purpose of collection, those exceptions do not extend to any form of research, analysis or compilation of statistics.

Western Australia stands out from the other jurisdictions in that it does not specifically regulate privacy either through legislation or administrative instruction. Various confidentiality provisions cover government agencies, and some privacy principles are provided for in the *Freedom of Information Act 1992 (WA)*.¹⁶ The Telethon Kids Institute (sub. 15, p. 15) recommended the introduction of specific privacy legislation in Western Australia that was compatible with other jurisdictions so as to enable data sharing:

There is no privacy legislation applicable to WA State government agencies. The use and disclosure of confidential information is restricted by statutory duties of confidentiality and the common law duty of confidentiality. There is a need for enabling legislation, such as [the] Data Linkage Act/Privacy Act, balanced between privacy rights and data sharing, to support data custodians and enable research for the public good. Any legislation should also ensure compatibility with Commonwealth principles [APPs] so WA can interface with data from the Commonwealth and other States.

However, separate education-related legislation in Western Australia specifically restricts the sharing of data. The *WA School Education Act 1999* limits the disclosure and use of personal information except in prescribed circumstances. Available exceptions do not include research and/or the compilation of statistics, although the relevant Minister has the power to authorise such disclosure and use (*School Education Act 1999 (WA)*, s. 242(7)). The Commission understands that the Minister has delegated such authority to the Director General of Education.

In addition, the *WA School Curriculum and Standards Authority Act 1997* restricts the release of student education data to students and their parents. The submission by the WA School Curriculum and Standards Authority (sub. 14, p. 11) noted that:

Currently, the *School Curriculum and Standards Authority Act, 1997* imposes restrictions on how student data collected by the authority can be used. The Authority is in the process of amending the Act through legislative processes to allow it to have more flexibility in the way it can share data.

The preceding discussion highlights a lack of uniformity in privacy regulation across jurisdictions and some of the practical implications of these differences. Greater uniformity of privacy laws would go some way towards reducing the regulatory complexity that

¹⁶ These include a common law duty to protect confidentiality.

contributes to risk averse behaviour by approval authorities and data custodians, and would facilitate access to data through regulatory co-operative approaches, such as mutual recognition.

Issues relevant to the use of data containing personal information have also been raised in the Commission's draft report on *Data Availability and Use* (PC 2016a). In that report, the Commission has proposed that for datasets designated as being of high value and which involve wider community benefits (likely to include education data collections), current and future restrictions on access would not apply if those datasets were added to the national system (box 5.2).

5.2 Other legislative restrictions

General legislation

Other federal legislation also deals with the handling of personal information. For example, the *Freedom of Information Act 1982* (Cwlth) provides a right of access to documents held by government agencies except in circumstances where such access would involve unreasonable disclosure of personal information. The *Archives Act 1983* (Cwlth) provides a similar exemption (ALRC 2014). Federal legislation also contains a large number of secrecy provisions that impose duties on public employees not to disclose information that comes to them by virtue of their office. As mentioned above, the higher standard applies in situations where there is overlap between different pieces of legislation.

Specific legislation

Provisions contained in various other legislation at the federal level require or authorise certain activities including the collection, use and disclosure of personal information. In an education relevant context, the *Census and Statistics Act 1905* (Cwlth) authorises collection by the ABS of large volumes of personal information but prohibits the ABS from the publication or dissemination of statistical information which would enable identification of particular individuals:

- (1) The Statistician shall compile and analyse the statistical information collected under this Act and shall publish and disseminate the results of any such compilation and analysis, or abstracts of those results.
- (2) The results or abstracts referred to in subsection (1) shall not be published or *disseminated* [emphasis added] in a manner that is likely to enable the identification of a particular person or organization.
- (3) The Statistician may make charges for results and abstracts published and disseminated under this section. (*Census and Statistics Act 1905* (Cwlth), s. 12)

Importantly, the Act applies to any datasets brought into the ABS or integrated (linked) by the ABS. This means that personal information contained in data collections from jurisdictions that allow the disclosure of that information cannot be used by researchers in an ABS linked dataset. Also, linkage of data from the Census of Population and Housing with other datasets can only occur using de-identified data (chapter 6).^{17,18} ACARA (sub. 62, p. 5) commented on the restrictions imposed on the ABS by its legislation in the context of developing an enduring dataset:

The proposed Australian Longitudinal Learning Database offers some benefits, but given limitations on access to data once held by the Australian Bureau of Statistics (ABS), this is not an ideal option.

Similarly, the Department of Social Services which is the data custodian for the *Longitudinal Study of Australian Children* and the *Longitudinal Study of Indigenous Children* is prevented from disclosing personal information. And the *Australian Institute of Health and Welfare Act 1987* (s. 29) prohibits the Australian Institute of Health and Welfare from making a record or divulging or communicating information about any person other than in accordance with the Act. Also, other Acts require or authorise the disclosure of personal information in a range of prescribed circumstances.¹⁹

In a different context, the legal framework that underpins childcare fee assistance protects childcare administrative data (and other data collected under the legislation) from being used or disclosed for the purposes other than outlined in the relevant Act (DET, sub. 68, p. 9). In particular, section 162 of *A New Tax System (Family Assistance) (Administration) Act 1999* (Cwlth) protects personal information collected as part of the administration of the Act, except in a range of prescribed circumstances (which include obtaining express or implied consent of the individual to whom the information relates).²⁰

As these administrative data are used by the ABS to construct the *National Early Childhood Education and Care Collection* (NECECC), the stricter privacy provisions of the Census and Statistics Act (mentioned above) apply to the NECECC. According to the DET (sub. 68, p. 9):

While it is right to protect the access and integrity of all data, this legislation places significant restriction around how NECECC data can be used by both the Australian Government itself, and its state and territory counterparts, thereby limiting its usefulness in contributing to the early childhood education evidence base.

¹⁷ Names and addresses collected during the Census have traditionally been deleted once the Census data have been collated. However, the ABS is seeking to hold such information for a period of four years for the 2016 Census and all subsequent Census collections.

¹⁸ Unit record data held for the ABS's *National Schools Statistics Collection* and the *National Early Childhood Education and Care Collection* would also be limited to the use of de-identified information.

¹⁹ Examples include the *Telecommunications Act 1997* (Cwlth), the *Income Tax Assessment Act 1936* (Cwlth) and the *Corporations Act 2001* (Cwlth).

²⁰ The Act also gives the relevant Minister the power (under s. 162(3)) to specify additional purposes for which protected information may be obtained, recorded, disclosed or otherwise used.

However, although the legislative provisions of the Family Assistance Administration Act and the Census and Statistics Act limit the dissemination of identified childcare data, the Family Assistance Administration Act does allow for the disclosure of protected information in an aggregated form:

A person may use protected information to produce information in an aggregated form that does not disclose, either directly or indirectly, information about a particular person. (*A New Tax System (Family Assistance) (Administration) Act 1999* (Cwlth), s. 162(2A))

There is a dichotomy between the use and disclosure of identified as opposed to de-identified information, and there is uncertainty created by the range of legislation dealing with the protection of personal information. This highlights the need for greater consistency within and across legal instruments, and also the need for careful legislative drafting to avoid the intent of the legislation and of general privacy laws being weakened.

As an example of the inconsistencies *within* legislative instruments, the *Australian Education Act 2013* (Cwlth) allows the use and disclosure of personal information collected from government and non-government schools (including for preschool delivered in a school setting) for a range of purposes including education relevant research and statistical analysis. The Regulations supporting the Act state in part:

- (1) For paragraph 125(1)(a) of the Act, the Minister may make a record of, use or disclose protected information for the following purposes:
- (a) the purposes of the Act or this regulation;
 - (b) programs administered by the Minister;
 - (c) research into matters of relevance to the Department;
 - (d) statistical analysis of matters of relevance to the Department;
 - (e) policy development;
 - (f) any other purpose determined by the Minister under subsection (3). (*Australian Education Regulation 2013*, r. 65)

However, as mentioned above, with respect to the collection of data on students with characteristics that are consistent with disadvantage (such as students from Indigenous backgrounds, students with disability or those engaged in distance education), the same education regulations (ss. 48, 50) state that the information collected must not explicitly identify any student. This results in fragmented access to components of the same dataset, which may also increase the costs associated with disclosure.

In terms of inconsistent treatment *across* legal instruments, the legislation that enables the collection of personal information from childcare services delivered outside formal school settings prohibits the release of protected (personal) information except in certain prescribed circumstances. Although there is general relief from the law which appears to allow sharing of de-identified data, this interpretation has not been universally accepted (as discussed above).

Greater legislative consistency is needed

Cross-jurisdictional data sharing activities present particular challenges for privacy regulations as personal information is subject to more than one regulatory regime. According to the OAIC (sub. DR140, p. 9):

When personal information is subject to more than one regulatory scheme, compliance can become more complex. Regulatory overlap can potentially inhibit the sharing of data even where the applicable regulatory schemes do not prevent the sharing of personal information. Some agencies and organisations may adopt a more risk averse approach when sharing information due to a failure to understand their obligations.

Reflecting on the ad hoc nature of legislative provisions for the use of personal information in health research a recent paper noted:

The current inconsistency of these statutes in relation to the research use of the data cannot be explained on the basis of the relative sensitivity of the data; rather it suggests the lack of a clear policy approach. Developing legislation to provide for the proposed new arrangements would provide an opportunity to ensure a consistent and principled approach. (Adams and Allen 2014, p. 969)

This suggests that greater legislative consistency is needed to enable the sharing of education (and other) data across jurisdictions and to deliver a national education evidence base. In recommending a suite of necessary changes to address privacy barriers, DET (sub. 68, p. 11) said that in regard to legislative restrictions beyond specific privacy laws:

It is also necessary to consider other legislative arrangements (for example, family assistance law and the *Australian Education Act 2013*) that govern protected information on children and students and look to improving how these can promote sharing of education data in a confidentialised framework that accords with privacy principles within the education sector and for education researchers.

As noted earlier, some jurisdictions are already headed in this direction. The School Curriculum and Standards Authority of Western Australia, for example, said that it was in the process of amending its own enabling legislation to allow greater sharing of data. And it suggested similar action was needed in other jurisdictions:

... the Acts governing agencies that collect and manage education data in Western Australia may need to be changed to allow data sharing. Without such changes, some agencies may be unable to participate in dataset sharing activities and [this] will affect data linkage activities over a range of data associated with education outcomes. State privacy Acts and government standards will also impact on data sharing and national and individual state and territory privacy legislation will need to be carefully considered. (sub. 14, p. 10)

The Population Health Research Network went further in calling for a staged solution culminating in a uniform national approach:

There are a number of approaches that could overcome the barriers that the legal framework causes. In the short term the provision of guidance materials and training to assist data custodian agencies to process requests for access to data would be worthwhile. In the medium

term changes to legislation to clarify use of specific data collections for research may be required. In particular, each jurisdiction (state, territory and Commonwealth) should have legislation that covers the collection, use and disclosure of education information. In the longer term, Australia should consider a more uniform national approach. (sub. 24, p. 3)

The suggestion from the Population Health Research Network that each jurisdiction should have legislation clarifying the use of specific data collections has been given effect in one jurisdiction. New South Wales has introduced laws to remove barriers that impede the sharing of government sector data between government agencies through the *Data Sharing (Government Sector) Act 2015* (NSW). This Act was also introduced to support the establishment of the NSW Data Analytics Centre (DAC), which is charged with delivering whole of government data analysis to inform evidence-based decision making and service delivery.

Importantly, that legislation *authorises* government agencies to share data voluntarily as well as giving the Minister power to direct agencies to share data. A critical element of the legislation is that it overrides other legislation that would otherwise act to restrict the sharing of data. The Act states:

Subject to subsection (2) [which quarantines personal information], a disclosure of government sector data by a government sector agency to the DAC or to another government sector agency is lawful for the purposes of any other Act or law that would otherwise operate to prohibit that disclosure (whether or not the prohibition is subject to specified qualifications or exceptions) if:

- (a) this Act provides that the agency is authorised to share the data with the DAC or other government sector agency, and
- (b) the agency provides the data to the data recipient only for the purpose to which the authorisation to share relates. (*Data Sharing (Government Sector) Act 2015* (NSW), s. 5).

As structured, the NSW legislation serves to modify or bypass the incentives facing data custodians operating within that jurisdiction. The centralisation of the data analysis task also avoids the need to seek approval from multiple ethics committees (section 5.3). But the Data Sharing Act only covers transfers of data between government agencies in New South Wales. The Act does not facilitate access to data by non-government researchers or enable data sharing with government agencies in other jurisdictions.

A Bill, which would similarly facilitate the sharing of data between public sector agencies for the purpose of assessing the efficacy of government policies, program management or service planning and delivery by public sector agencies, has also recently been introduced into the South Australian Parliament. The *Public Sector (Data Sharing) Bill 2016* largely mirrors the legislation in New South Wales in authorising: public sector agencies to share data; empowering the relevant Minister (or their delegate) to direct a public sector agency to provide public sector data; and establishing an Office of Data Analytics. The SA legislation also specifically references the ‘5 Safes’ trusted access principles to minimise the risk that shared data will be misused (chapter 6). The Bill does not provide scope to share data with other jurisdictions.

Ultimately, the outputs from these jurisdictional initiatives will influence whether similar legislative approaches are adopted in other states and territories. And while wider adoption would go some way to achieving legislative consistency, the resulting jurisdictional silos are unlikely — given the scope of the New South Wales and South Australian provisions — to enable sharing of data between states and territories. This obviously limits their value from a national viewpoint. National benefits would be enhanced if legislation was introduced at a national level to facilitate data sharing and release. The reform proposal in the Commission’s draft report on *Data Availability and Use* would provide the framework for a national approach (box 5.2).

That said, the Commission recognises that a nationally consistent legislative approach will take some time to develop. In the interim, an option to make the best use of data at the Australian, state and territory government levels could be to follow the recommendations contained in a submission by SA NT DataLink to the recent Senate Select Committee on Health Inquiry into Health Policy, Administration and Expenditure (SA NT DataLink 2015). It suggested that legislation and policy guidance be developed to allow access to data from Australian Government agencies:

While a nationally consistent legislative approach would be desirable ... it is recognised that this would be a longer term objective requiring the cooperation of all State and Territory governments.

In the interim, the legislation and policy principles that govern the provision of Commonwealth held data for linkage with State, Territories and non-government data should be considered a priority in order to make the best use of the data at State and Territory and Australian government levels. In particular, how legislation and/or policy directions may apply to agencies such as the Department of Health, the Department of Human Services and the ABS. (SA NT DataLink 2015, p. 9)

In the Draft Report, the Commission recommended that all governments pursue legislative consistency in regulating the use and disclosure of education information (across both education-specific and other statutes). Most participants favoured the proposal. Goodstart Early Learning (sub. DR135, p. 8) said it:

... supports this recommendation as it would provide a consistent legislative approach to the collection and disclosure of education data which would greatly assist in being able to interrogate data to inform effective policy and practice.

The OAIC (sub. DR140, p. 9) also supported the recommendation but cautioned that ‘... care should be taken to ensure that existing safeguards for the protection of personal information are not unduly weakened...’. Universities Australia (sub. DR121, p. 3) suggested advances in technology provided new ways to protect privacy while making information available.

There would be numerous benefits in harmonising privacy and security legislation across jurisdictions and agencies, and in developing governance arrangements and systems that would facilitate linking data from different areas, including uniform recognition of ethics approvals. Teacher workforce data, for example, is needed to assist decision makers in

universities, schools, communities and government to plan for teacher training and identify specialisations in demand. Variability of state and territory data collection limits our capacity to undertake both short- and long-term national workforce planning.

RECOMMENDATION 5.4

The Australian, state and territory governments should pursue legislative consistency in education and related Acts regulating the use and disclosure of education information to facilitate improved access to data for public interest research.

5.3 Multiple approval processes

In the education sphere, administrative and other data are fragmented and sector-specific with data collected from (and held by) a variety of sources. Often there are multiple custodians involved in collecting and managing components of the same dataset. In total, there are more than 30 separate education data custodians each requiring approval before data can be accessed (chapter 6). Research proposals also require approval from research ethics committees before applications to data custodians will be considered. Attempts at linking education data with data from other domains expands the requisite approvals even further.

Delays involved in seeking approval from data custodians and research ethics committees were a major concern in submissions and in discussions with stakeholders. The Commission was told that many research projects simply do not proceed because of the delays experienced in gaining approval across jurisdictions and between school systems. The Telethon Kids Institute (sub. 15) commented that the data application process was extensive and that there were multiple unnecessary pathways required for approval. It separately identified ethics committee and data custodian approval processes as the two major bottlenecks to access and use of education data.

The need to obtain ethics and access approval from each state/territory department of education, Catholic Education in each jurisdiction (and individual catholic schools in some jurisdictions) and independent schools is time consuming. The ethics requirements of each jurisdiction's various education bureaucracies are different meaning that each application can require up to 24 versions to satisfy each sector and jurisdiction.

Obtaining data custodian approval is also problematic. There may be a lack of trust between department staff and researchers about how the data will be used. Education bureaucracies are risk averse to the release of data. In some instances, parental agreement to participate and release the necessary data has been overturned by the bureaucracies. WA has a formal Intellectual Property Agreement that requires all researchers making use of its linked data to provide custodians with copies of all reports prior to their release. Custodians have two weeks to review the reports. (sub. 15, p. 10)

The Fraser Mustard Centre (sub. 52, p. 3) (a collaboration between the SA Department of Education and Training and the Telethon Kids Institute) provided a specific example to highlight the complexity and protracted nature of current approval processes.

The Fraser Mustard Centre has also been involved in a national data linkage project initiated in 2013 aiming to link the perinatal data of children born in 2006-2007 to their 2009 AEDC data and year 3 NAPLAN [National Assessment Plan — Literacy and Numeracy] results across all states and territories in Australia utilising the NCRIS [National Collaborative Research Infrastructure Strategy] funded data linkage infrastructure. To date this has required 18 ethics applications and approvals from over 25 custodians of data, and despite positive support from all education based custodians involved, we are yet to receive linked data from any state or territory. By the time any linked data is received, the data will have been superseded by both the 2012 and 2015 AEDC cohorts of children.

Elsewhere, the Faculty of Education at The University of Western Australia (sub. 10, p. 2) focused on the logistical challenges of dealing with multiple data custodians:

At present, most identified data sets are held at either the jurisdiction and service level or the school level and it is cumbersome if not impossible to coordinate linkage projects across the many data custodians involved.

Options to reduce approval delays

Potential improvements to approval processes have been suggested both in submissions and elsewhere, including the adoption of nationally consistent data release standards for data custodians and the centralisation of approval decisions including those by ethics committees (box 5.6).

Consistent data release standards would involve the introduction of policy guidelines at the national, state and territory levels which place an onus on departments to release data unless an exception can be justified (Fraser Mustard Centre, sub. 52). This would provide data custodians with a mandate to release data and hence mitigate the risk aversion evident in the current system. It would also allay concerns that some custodians favour certain researchers and research institutions over others (Fraser Mustard Centre, sub. 52).

Box 5.6 Views on options to address approval delays

The Telethon Kids Institute (sub. 15, p. 14) said the consequences of multiple approval bodies could be addressed by moving towards centralised approval processes:

Moving forward, it is important for approval processes to be streamlined and based on a centralised approval process, and for data custodians to provide approval at just one stage of the application process. There may be scope for single cross-agency ethics approvals in the future under a whole-of-government model.

Researchers on a recent project attempting to link *National Assessment Program — Literacy and Numeracy* (NAPLAN) and *Longitudinal Survey of Australian Youth* data suggested that project approval should be coordinated at a national rather than state or territory level:

Coordinating the differing requirements of each jurisdiction proved to be one of the most challenging aspects of the project. To help remedy this, project approvals could be obtained through existing national governance processes established to support the work of the Education Council, rather than separately for each state and territory, with the Commonwealth playing a key role in coordinating changes to the current agreements and existing protocols to support this. (Lumsden et al. 2015, p. 32)

The Fraser Mustard Centre (sub. 52, p. 2) argued for the standardisation of data release and sharing practices, in part because of biases in the current system that lead to data being shared more freely with some institutions than others.

Whilst there are currently rules and frameworks in place to support data release and sharing, too often these provide few incentives to individual decision makers to decide in favour of releasing data or to direct the resources required to deliver data quickly.

When political will at a senior executive level is favourable a cultural shift can occur that enables data to be shared, however, data release and sharing practices should be standardised and guided by nationally accepted standards to ensure equity in access for institutions.

Guidelines would also establish a framework for reasonable timeframes for data release depending on the use of the data and the associated public benefits. Accordingly, this approach would likely streamline and hasten the granting of approvals by education data custodians. Detailed guidelines could follow the template outlined in a recent paper which canvassed avenues to address impediments to health data access. In that paper, Adams and Allen (2014) argued that access to information should be based on a default position that release is warranted unless there is a strong public interest in protecting the information (the approach adopted under the *Freedom of Information* (FOI) regime). Governance arrangements to guide custodians were identified to facilitate access in the public interest, including in relation to timeframes, conditions of release, decision-making criteria, notification of reasons for decisions and review mechanisms (box 5.7). The Commission's recommendations in the *Data Availability and Use* draft report (PC 2016a) would address this issue.

Box 5.7 **Improving access to education datasets**

Adams and Allen (2014) drew on governance arrangements under Australia's *Freedom of Information* (FOI) regime and public sector information management arrangements including *High Level Principles for Data Integration Involving Commonwealth Data for Statistical and Research Purposes* to inform the design of a pro-disclosure regime for data custodians.

Presumption of openness

Where a research ethics committee has considered the balance between privacy and the public interest, as well as the privacy and security protocols in place in relation to a particular research project, and has approved that project, then the data should be released unless there is a countervailing public interest that an agency is prepared to articulate and defend.

Timeframes

Imposing time limits on decision-making processes avoids unnecessary delays on approvals that may turn into de facto refusals. Statutory timeframes would enhance efficiency in decision making and assist in the planning, budgeting and staffing of research projects. Current approval processes involving preliminary consultations with data custodians for in-principle support, ethics approval from all relevant ethics committees and final approval from data custodians before a proposal joins a data linkage and extraction queue, can take in excess of two years.

Conditions of use

Conditions are regularly imposed on researchers seeking to re-use health datasets to safeguard privacy and personal information. Conditions include: certain prohibitions on re-use, sharing and unauthorised mergers of datasets; that published results do not contain identifiable information; protocols for the secure storage, analysis and archiving of data; timeframes for use; and destruction or return of data. Conditions should not unnecessarily restrict possibilities for re-use.

Decision-making criteria

Developing criteria for decision making that must or must not be considered by data custodians would improve transparency and consistency. Criteria for release could include that an accredited ethics committee had approved the research in accordance with appropriate privacy and security protocols. Criteria could stipulate that decisions must not be based on the likelihood that research results might reflect poorly on government programs or policies.

Reasons for decisions

Data custodians should be required to publish reasons for refusing or deferring an application in writing. Reasons should be linked to the decision-making criteria and based around public interest factors. Access to reasons behind decisions is a fundamental principle of administrative law and necessary to provide an effective right of review.

Application for review

Currently, there is no mechanism for researchers to seek independent external review of a data custodian's decision to refuse access to a dataset. Such a role could be performed, in the first instance, by the Office of the Australian Information Commissioner, given their role in regulating privacy and FOI regimes and in approving ethical research protocols such as those in the National Statement. Administrative Appeals Tribunal and judicial review are secondary options.

Source: Adams and Allen (2014).

The OAIC (sub. DR140) supported the Commission’s recommendation for policy guidelines to be introduced and said well-drafted guidelines (which address privacy risks) setting out expectations on data custodians would improve clarity, certainty and help build public confidence. But its support for the Draft Recommendation was conditional on custodians having the capability and capacity to manage privacy and security risks associated with sharing data. Among a suite of measures to manage privacy risk effectively, the OAIC advised that a privacy impact assessment (PIA) must be conducted.

... if guidelines were to be developed, they should also require that, where relevant, data custodians must undertake a written PIA prior to developing new information sharing arrangements or undertaking high risk data integration projects. I would encourage the use of a PIA to assess the potential privacy impacts of such projects to ensure that the personal information handling activities are accompanied by an appropriate level of privacy safeguards and accountability. The PIA should assess the overall proportionality of the project, and consider broader external perception risks. (sub. DR140, p. 11)

Another option would involve shifting responsibility for approving access to education data away from individual custodians to a centralised authority at arms-length from the data custodian. Such a move would address the risk aversion facing custodians directly and make the process of accessing education data more streamlined, transparent and efficient. This would also be consistent with proposed reforms in the Commission’s draft report on *Data Availability and Use* which would effectively transfer approval decisions from initial data custodians to Accredited Release Authorities and (where relevant) ethics committees (box 5.2).

RECOMMENDATION 5.5

The Australian, state and territory governments should introduce policy guidelines which give explicit permission to data custodians to share data to facilitate public interest research. Those guidelines should include timeframes, conditions for release, criteria for decision making, reasons for decisions and review procedures.

Mutual recognition

An alternative approach could involve the use of national guidelines for a system of mutual recognition of approval decisions by data custodians and ethics committees. As noted above, jurisdictional privacy legislation provides scope for mutual recognition of approvals by allowing the transfer of personal information between jurisdictions with substantially the same privacy principles. While the Commission is not aware of any examples of such transfers this may reflect the range of countervailing influences on approval bodies (not least of which is the absence of a mandate to release data).

Importantly, mutual recognition is a feature of the ethical approval process in health research. The *National Statement on Ethical Conduct in Human Research* contains specific provisions aimed at minimising duplication of ethical review in a range of research settings:

Wherever more than one institution has a responsibility to ensure that a human research project is subject to ethical review (see paragraph 5.1.1), each institution has the further responsibility to adopt a review process that eliminates any unnecessary duplication of ethical review. (NHMRC, ARC and AVCC 2015)

An agreement operating in several states also provides a mechanism for single ethical and scientific review of multi-site research projects. Under the agreement known as *National Mutual Acceptance* (NMA) multi-site human research projects are reviewed for ethical and scientific merit once only by an National Health and Medical Research Institute certified HREC from a participating jurisdiction. New South Wales, Victoria, Queensland and South Australia are current participants in the NMA. Originally restricted to clinical trials, the scope of the NMA was expanded to include all forms of human research in December 2015.²¹

Support for applying the approach in health to address the ‘time consuming and costly endeavour’ of dealing with multiple jurisdictional education data holdings came from the submission by the National Centre for Vocational Educational Research (sub. 65, p. 4):

Consider a process for single review and approval for work involving multiple data custodians. This may be similar to the National Health and Medical Research Council’s Human Research Ethics approvals for multi-site work, as discussed in chapter 5.3 of the *National Statement on Ethical Conduct in Human Research* ...

However, the Commission understands that the mutual recognition principle is not universally applied in the health area despite the guidelines in the *National Statement*. In a recent Senate Select Committee on Health Inquiry into Health Policy, Administration and Expenditure (SSCH 2016a), several examples were provided of multiple jurisdictional approval requirements that created lengthy delays in securing health research approval. The Committee noted in particular that Australian government departments were currently not recognising ethics approvals obtained in the states and territories. It went on to recommend that:

... the [Australian] government take a whole-of-government approach to streamlining the ethics approval process and the authorising environment in consultation with the Privacy Commissioner, privacy advocates, the NHMRC, data custodians, academics, consumers and the States and Territories. The government should also work with the States and Territories to establish a national accreditation system so that ethics approvals from accredited jurisdictions are recognised by the Commonwealth. (SSCH 2016a, p. 58)

²¹ The NMA was given effect through the signing of a *Memorandum of Understanding*.

The Commission invited participants to comment on the operation of mutual recognition in the health area with a view to garner lessons for education research. The PHRN responded by noting that despite the formal arrangements in place for mutual recognition of approvals in health, projects were still subject to multiple ethical approvals.

The NHMRC's National Approach to Single Ethical Review has delivered certification of HRECs and the recognition of single ethical review within and between jurisdictions. Despite there being some acceptance of single ethical review of multi-centre clinical trials, many linked data projects are still required to undergo full HREC review in every jurisdiction supplying data. For those research projects focusing on Aboriginal and Torres Strait Islander populations, researchers are also required to undergo full HREC review with Aboriginal Health Research and Ethics Committees in each jurisdiction. (sub. DR110, p. 3)

The PHRN went on to say that in the absence of single ethical review it had developed its own training materials to assist in the efficiency and consistency of HREC decision making. But the Telethon Kids Institute, on the other hand, suggested that for projects within Western Australia at least, single ethics approval was a reality:

In Western Australia, when cross-agency linkage is required, researchers apply through the WA Department of Health Human Research Ethics Committee (DOH HREC). This approval is seen as appropriate ethics approval to access data from other WA agencies. (sub. DR129, p. 3)

In an education specific context, the Queensland Government pointed to a recent initiative to streamline the application process for researchers applying to conduct school-based research across multiple jurisdictions (including ethical requirements).

Queensland is currently participating in the pilot of a National Application Form to conduct research in schools in more than one state or territory. Under the pilot, researchers wishing to undertake research in more than one state or territory complete a single national application form and apply to each jurisdiction. Applications are assessed by each jurisdiction according to their individual research approval guidelines. (sub. DR142, p. 9)

The Commission considers that this single application system has more general applicability to ethical approvals for education research beyond school settings. A similarly broad approach operating in the health sphere — the National Ethics Application Form — was identified in the submission by the Telethon Kids Institute (sub. DR129) as a feature of the *National Approach to Single Ethical Review of Multi-Centre Research*.

In summary, the Commission sees considerable benefit from allowing greater access to and use of existing education data. Improved access would serve to facilitate better analysis and assessment of education system performance, and through this inform decision making and improve service delivery. The Commission has recommended a suite of changes that it considers would enhance the ability to deliver these benefits. In certain cases, these recommendations support those made by other review bodies or broaden the application of existing jurisdictional reform initiatives.

6 Data linkage

Key points

- A data linkage capacity leverages the value that can be drawn from existing education (and other) data. For example, it:
 - allows a more comprehensive understanding of the factors that contribute to an individual's life-course outcomes
 - provides scope for targeting interventions by teachers and schools to address specific student characteristics, such as disability and indigeneity.
- Linkage is most effectively conducted using personal information that identifies individuals. Identified data reduces errors in linkage processes, and allows for targeted research and policy interventions at the individual or school level.
- Where identified data is unavailable (due to legislative or other constraints) linkage relies on the use of statistical linkage keys to match records in different datasets.
- Impediments limiting the scope to link education and other datasets include privacy and other legislative barriers (discussed in the previous chapter), risk aversion by education data custodians, the project-specific nature of data linkage arrangements, the cost of linkage infrastructure and the comparability of data across education and other datasets.
- Education data custodians are reluctant to allow their data to be linked despite the availability of sophisticated data security arrangements which significantly lower the risk of sensitive (personal) information being compromised.
- There has been significant recent investment in national linkage infrastructure. But current national linkage arrangements do not readily allow linked data resources to be retained on an ongoing basis. This is inefficient and leads to duplication in the process of constructing linked datasets.
- The system of data linkage would be improved if linked data were retained and a national education master linkage key developed.

Data linkage offers significant opportunities to use and harness the value of existing education, employment, health and other social datasets, but there are impediments which limit the scope to link datasets. These impediments include legislative barriers, inconsistent data standards and inefficient ethics approval processes. Earlier chapters have canvassed options to address these impediments in the context of bridging gaps in education data and evidence. This chapter focusses on impediments to effective data linkage.

6.1 The power of data linkage

Data linkage refers to the process of matching records on the same individual contained in different data sources (from administrative, survey or other data collections) so that the sources are combined to present more comprehensive information about those individuals (Gemici and Nguyen 2013). Linkage can take place across datasets in a single domain (education) or across domains (early childhood development, education, employment, health, disability, income and housing). It is a valuable tool for population research as it provides a broader picture of the population, can be more cost-effective relative to other data collection mechanisms (surveys), enables studies to be done that could not otherwise be performed and reduces respondent burden. But linkage relies on access to shared datasets (chapter 5).

The Commission has previously highlighted the significant potential benefits of matching administrative and other datasets (PC 2013a). It noted that, used for policy analysis, data matching can enhance and better target effective programs, identify ineffective programs across a range of government services, allow independent verification of official evaluations, and provide insights to government at low cost. By linking data across domains, it is also possible to analyse the pathways for individuals with characteristics that make them vulnerable to disadvantage. Options to intervene can then be explored.

Moreover, the magnitude of current and projected expenditures on education means data matching presents an enormous potential opportunity for Australia. The Commission notes that Australia (despite specific achievements in health linkage) is well behind other countries in allowing access to administrative data for research and other purposes. New Zealand, Canada, Denmark, Sweden, Finland and the Netherlands all allow access to administrative datasets for research purposes. While most of these countries do not share the challenges presented by Australia's federated system of government, countries such as Canada are proof that jurisdictional differences are not an insurmountable barrier to data linkage.

Support for data linkage and the potential this process offers for policy development was widespread among participants to this inquiry (box 6.1) and also among those providing input to the Commission's wider Inquiry into *Data Availability and Use* (PC 2016a). The data linkage (and other) issues canvassed in both these inquiries overlap considerably and the Commission's conclusions are consistent.

Box 6.1 Participants' views on data linkage

The Australian Government Department of Education and Training (sub. 68, p. 2) referred to the importance of linkage for social policy development:

Achieving a more integrated and cost-effective national education evidence base would enable continual improvement of educational outcomes for young people and the systems that support them. Beyond the education context it would add to the stock of social policy evidence and add considerable value through data linkage work to support broader social policy development.

The National Catholic Education Commission (sub. DR106, p. 7) focused on the opportunities that linkage provides for targeting aspects of disadvantage:

Data linkage with early years, health and student outcomes data such as NAPLAN would usefully enhance these datasets and provide an evidence base for generating insights into areas of interest such as the intergenerational impact of disadvantage. It would also potentially enrich the capacity for predictive analysis to provide insights into when different educational (or other) interventions may have the strongest positive impact on student outcomes.

The Minderoo Foundation (sub. 27, p. 5) similarly hailed the potential for data linkage to improve outcomes for disadvantaged children:

Multiple events and circumstance propel children towards educational and social failure. Comprehensive, linked data are instrumental to understand these external determinants at a population level and inform the development of appropriate policy responses.

Speech Pathology Australia (sub. 35, p. 15) referred to opportunities that data linkage potentially provided for early intervention to address issues for children with specific disabilities:

There is very strong research evidence that early intervention (prior to school commencement) offers the most significant value in terms of improving communication outcomes for children. A linked, longitudinal data set offers an opportunity to monitor these children, determine their trajectory for educational outcomes and provide interventions (teaching or speech pathology for example) at an appropriate time point in their education whereby intervention is going to offer the most cost-effective improvements.

The Australian Institute of Health and Welfare (sub. 55, pp. 6–7) listed a range of benefits that linkage offers in a secure environment:

Data linkage is a practicable method to address data gaps in education and training data collections. Data linkage works as a powerful tool for identifying multiple appearances of individuals and for linking their information across datasets. This allows datasets, which collect different information about the same individual to be brought together in a secure and appropriately managed way. Where feasible and appropriate, data linkage can reduce data provider and respondent burden and maximise efficiency of data collection.

The ABS (sub. 78, pp. 2–3) focused on the potential benefits offered by linkage processes:

The ABS believes there are many potential benefits arising from the integration of datasets, particularly at the national level. These include:

- Consistent treatment of data through the integration process ensuring robust, comparable output. This in turn means that opportunities to compare natural experiments (for example exploring the impact of differences in school starting age) can be done efficiently and effectively;
- Consistent metadata;
- Streamlined release and access practices;
- Establishment of a 'one stop shop' model, where large volumes of subject matter are held in the one location supporting effective knowledge of, and easier access to, data and statistics.

Data linkage processes

Where personal information is collected and available to be used (identified data), linkage between datasets can be performed by matching names, date of birth, gender and other demographic data such as addresses across data collections. But as discussed in chapter 5, privacy and other legislative restrictions may prevent the use of personal information for a purpose other than the primary purpose the data was collected (such as in order to deliver a government service). In the absence of personal information, linkage relies on the use of statistical techniques to match records in different datasets (box 6.2). Importantly, linkage requires the use of the same linkage key in the different data collections.

Box 6.2 Deterministic and probabilistic linkage methods

Data can be linked using either deterministic or probabilistic linkage methods. A combination of linkage methods may also be used in any one project, but the choice of method depends on the types and quality of linkage variables available in the datasets to be linked (AIHW and ABS 2012).

Deterministic linkage methods use common identifiers across different data sources known as statistical linkage keys (SLKs). Deterministic linkage involves simple matching of all complete SLKs. However, errors in key recording, statistical keys that are common to multiple individuals, and a failure to match keys belonging to the same individual all lead to reduced linkage success rates. The Telethon Kids Institute (sub. 15, p. 7) argued that these types of errors meant linkage keys were inferior methods of linking (compared to using personal information identifiers) because:

... a statistical linkage key is not sufficient to enable good quality, robust linkage. Data should include as much information as possible to inform (including name, address and date of birth) as there are often errors in point of collections, leading to incorrect SLKs. These errors lead to incorrect or missing matches when linking data. Having full identifying information reduces the likelihood of this error. There are many ways that linkage can be achieved, using identifying information that protects individual privacy.

The probabilistic method, on the other hand, links records using a combination of several representative identifiers such as name, gender, date of birth and address. Representative identifiers are used to compute the probability of two records from different data sources belonging to the same individual. The two records are then linked once a threshold probability level is reached (Gemici and Nguyen 2013).

Unique student identifiers

A unique student identifier (USI) (which is discussed in chapter 4) is also relevant to data linkage because it can effectively be used as a linkage key. However, the applicability of a USI for data linkage in education is limited by its specific nature. While linking errors in the education domain would be less likely under a national USI, they would not facilitate the linking of education data with data from other domains (such as health), because different identifiers are used in those domains. The Office of the Australian Information

Commissioner (OAIC) (sub. 69, p. 15) acknowledged this point in saying that while unique identifiers were an effective means of facilitating linkage between education datasets:

... when calculating the potential costs and benefits of a [unique identifier] scheme, the Productivity Commission will need to address the problem of linking education data to data collections outside of the education sector.

There were mixed views among participants about the value of a unique identifier for linkage and research purposes (box 6.3). Opponents focused on specific issues such as the legislative barriers associated with an identifier created for one purpose which is then used for other purposes (including research and linkage), while others supported the concept in more general terms. Given the nature of this feedback and the Commission's view that statistical linkage keys are an effective substitute to USIs (for linkage purposes), it does not consider that data linkage requirements provide a justification for the introduction of a national system for a USI *in their own right*. But as discussed in chapter 4, there are considerable benefits from adopting a nationally consistent USI system, including that it would streamline the collection and processing of data and facilitate the sharing of information between decision-makers across the education system.

6.2 Impediments to data linkage

Although there is a large amount of education data collected on the early childhood, education and training sectors in Australia, much of it is not linked with potential explanatory data held in other education or non-education collections. The Australian Government Department of Education and Training (sub. 68, p. 1) noted:

The capacity to link and fully utilise all the evidence available to bolster research, analysis and evaluation across the education system, sector and cohort level is minimal.

In large part, this situation reflects the fragmented and sector-specific nature of education and other data collections. There are more than thirty education data custodians and multiple custodians are often involved in collecting and managing components of the same dataset (table 6.1). Such fragmentation is in part the result of jurisdictions having responsibility for education service delivery, the different purposes for which education data is collected, and the ad hoc approach to determining data custodianship when new data collections are introduced.

But there are also broader challenges to efficient education data linkage, including misaligned incentives and a risk averse culture among data custodians, the project-specific nature of current data linkage arrangements, and the comparability of data across datasets.

Box 6.3 **Participants' views on the role of unique identifiers for linkage**

Some participants viewed a unique student identifier (USI) as a drawback to inter-jurisdictional research. The Population Health Research Network (sub. 24, p. 6) said in this regard:

Reliance on the Unique Student Identifier, or any unique identifier, may limit intra and cross-jurisdictional research because:

- the use of a Unique Student Identifier will not solve the problem of linking education data to data collections outside of the education sector such as births, deaths, hospital, justice and housing
- there are legislative and ethical barriers to using an identifier created for one purpose which is then used for another purpose.

In general, probabilistic linkage using identifying variables such as name, address, date of birth and sex provides better linkage quality than a Unique Student Identifier when linking across years, geographical locations and data collections.

The Tasmanian Government (sub. 75, p. 5) also questioned the need for a USI and cited successful jurisdictional linkage research performed without such an instrument:

A USI is certainly not essential for good research outcomes. Quality research projects, which have been developed and progressed by the ABS with Tasmania and Queensland, demonstrate that fact.

The OAIC (sub. 69, pp. 14–15) highlighted the risks of using a USI beyond its primary purpose:

Any unique personal identifier raises a significant privacy risk of inappropriate data linking or use of the identifier without justification beyond the original purposes. Such linkages may combine personal information that has been collected for very different purposes and create rich datasets about individuals' interactions in society. Given the privacy risks associated with unique identifiers, it is important that identifiers are not permitted to be used beyond their original intention without sufficient consultation and scrutiny. The introduction of an identifier to the education sector therefore needs to be accompanied by strong legislative safeguards to limit the possibility of 'function creep'.

Other participants were more supportive on general grounds that a unique identifier would facilitate linkage processes. The New South Wales Government (sub. 79, p. 5) said:

A national USI will significantly improve the capacity of researchers to undertake better analysis, and make better comparisons, via complex data matching processes and data linkages.

Similarly, ACARA (sub. 62, p. 4) commented that:

The availability of unique student identifiers (with proper privacy protections) or, at least, a nationally consistent approach to student identity management, will greatly facilitate data linking.

The National Catholic Education Commission (sub. 49, p. 7) said that a USI would make education data more accessible:

There is a need to make student data more accessible for data linkage, which could provide further insights into student achievement. A unique student identifier (USI) is a way of addressing this need. It would be an opportunity for longitudinal data that could provide insights across the life cycle of learning — from early childhood to post-school pathways.

The Australian Children's Education and Care Quality Authority (sub. DR108, p. 4) said:

Having a single national student identifier that covered the early childhood education and care and school sectors would enable researchers to track a (de-identified) individual's trajectory through the education system and look at the impact of early childhood education and care and other factors on later outcomes. Having a single national student identifier ... would create the opportunity to trace individual children from the point at which they enter the regulated and government subsidised education and care system, through their entire education journey.

Table 6.1 Australia's education data custodians

<i>Jurisdiction</i>	<i>Data custodian</i>	<i>Data collection</i>	
Commonwealth	ABS	Australian Census of Population and Housing National Schools Statistics Collection National Early Childhood Education and Care Collection Childhood Education and Care Survey Survey of Education and Work	
	Australian Curriculum, Assessment and Reporting Authority (ACARA)	National Assessment Program – Literacy and Numeracy (NAPLAN)	
	Australian Data Archive	Australian Early Development Census Longitudinal Survey of Australian Youth	
	Australian Government Department of Education and Training	Australian Early Development Census Child Care Management System Programme for International Student Assessment (PISA) School Teacher Workforce Data	
	Department of Social Services	Longitudinal Study of Australian Children Longitudinal Study of Indigenous Children	
	National Centre for Vocational Education Research (NCVER)	Longitudinal Survey of Australian Youth	
New South Wales	NSW Board of Studies	NAPLAN	
	NSW Department of Education, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection	
	Victoria	Victorian Curriculum Assessment Authority	NAPLAN
	Victoria	Victorian Department of Education and Training, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection
Queensland	Queensland Curriculum Assessment Authority	NAPLAN	
	Queensland Department of Education and Training, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection	
	Western Australia	WA School Curriculum and Standards Authority	NAPLAN
Western Australia	WA Department of Education, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection	

(Continued next page)

Table 6.1 (continued)

<i>Jurisdiction</i>	<i>Data custodian</i>	<i>Data collection</i>
South Australia	SA Department of Education and Child Development	NAPLAN
	SA Department of Education and Child Development, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection
Tasmania	Tasmanian Department of Education	NAPLAN
	Tasmanian Department of Education, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection
ACT	ACT Education and Training Directorate	NAPLAN
	ACT Education and Training Directorate, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection
Northern Territory	NT Department of Education	NAPLAN
	NT Department of Education, Catholic and Independent schools	Student administrative data Student performance data National Schools Statistics Collection National Early Childhood Education and Care Collection

Misaligned incentives and risk aversion

The incentives facing data custodians are not conducive to releasing the data they control to facilitate linkage (including releasing data directly to researchers). While the benefits of data linkage are spread widely across the community, the consequences of adverse outcomes from the misuse of personal information are borne by the custodian and the individual or individuals whose privacy is breached. These concerns exist despite the availability of sophisticated data security protocols which significantly lower the risk of sensitive information being compromised (box 6.4). That said, there may also be concerns from data custodians that information could be used to assess or compare performance between jurisdictions or to influence education funding (chapter 3).²²

²² A specific example given to the Commission was the federal government using parental income data as an input to jurisdictional funding allocations. The submission by the Australian Government Department of Education and Training gave an example of a lack of access to state and territory information detailing education expenditure for specific student groups, which made it harder to understand the impact of federal education investment (sub. 68).

Box 6.4 **Protecting sensitive information**

The separation principle

The separation principle is a mechanism used by data custodians and integrating authorities to protect the identities of individuals as part of the linking and merging process used to form integrated datasets. Under the principle, staff involved in linking datasets only see identifying information needed to create the linkage key between different datasets (such as name, address and date of birth) while those involved in analysing the integrated data only have access to de-identified data specific to project requirements. The principle means that no one working with the data can view both the linking (identifying) information together with the merged analysis (content) data (such as clinical information) in an integrated dataset.

Depending on project requirements and linkage models used, data custodians may separate the identifying information (such as name and address) from the content data (for example, administrative or clinical information) before it is transferred to the integrating authority. Alternatively, where legislation and other requirements permit, data custodians may submit the entire encrypted dataset (containing both identifiers and project-specific content information in one dataset) to the integrating authority. The integrating authority is then responsible for applying the separation principle, unless access to the identified integrated data is required and approved for the purpose of the project and permitted by legislation.

The separation principle is one way to protect the identities of individuals in datasets during the linking and merging process used to form the integrated dataset. After the linkage, it is the responsibility of the integrating authority to appropriately confidentialise the data before it is made available to researchers — in accordance with the requirements of data custodians (NSS 2016).

Five Safes model

The Five Safes model is a framework for designing, describing and evaluating data access systems that maximise the value of data while minimising the risk that data will be misused. The model integrates analysis of opportunities, constraints, costs and benefits of different approaches to managing data access. It takes into account the level of data identification, likely users, the environment through which data are accessed and the statistical outputs derived from data use. The elements of the Five Safes model are:

- Safe People — can the researcher(s) be trusted to use the data appropriately?
- Safe Projects — is the data to be used for an appropriate purpose?
- Safe Settings — does the access environment prevent unauthorised use?
- Safe Data — is there a disclosure risk in the data itself?
- Safe Output — are the statistical results non-disclosive?

According to the (ABS 2016g, p. 11):

The ABS is currently trialling a new trusted data access model under the five safes framework. By carefully assessing people, projects, settings, data and output, appropriate controls can be put in place to maximise the use of data while protecting privacy and confidentiality. The five safes framework is already in use in the United Kingdom, New Zealand and the European Commission.

Risk aversion is not restricted to state and territory education authorities. A recent study (Allen et al. 2013) commented that there is also a risk averse culture in Commonwealth departments which focuses on privacy risks and may not place sufficient weight on the

benefits of the research findings and the risks of not doing the research. This view was reinforced in the submission by the Australian Institute of Health and Welfare (AIHW) (sub. 55, p. 9):

Despite this increasingly accessible infrastructure and repeated recommendations to increase data sharing across the Commonwealth ... the level of Commonwealth data sharing today is generally below the level required to appropriately harness the value of Commonwealth data holdings.

The practical consequences of risk-averse behaviour by data custodians is highlighted in a recent unsuccessful attempt by the AIHW to establish an ongoing national early childhood development dataset. A similar outcome befell an attempt by the ABS to develop a much broader integrated dataset of education and socio-demographic information constructed from existing data sources that was to be known as the Australian Longitudinal Learning Database (ALLD).

The ALLD was intended to:

- link education data to the *Census of Population and Housing* and potentially to survey data
- integrate early childhood education and care, schools and Census data with educational performance measures
- link to vocational and higher education data
- integrate datasets from other areas (such as health and community services).

As proposed, the ALLD would be constructed primarily using linkage techniques without identifying individuals. This would be done through the use of variables such as age, sex, geographical location and other socio-demographic characteristics to match records from one dataset to those in another. But progress with the ALLD has stalled. The Commission understands that this was primarily because of differences in resource capacity among stakeholders and a lack of jurisdictional support.

More recently, the post-draft report submission by the ABS pointed to a range of specific initiatives which have been progressed through jurisdictional co-operation:

With the strong support of the Australian Government Department of Education and Training and the State and Territory Education departments the ABS has recently made significant progress in bringing together some important education datasets and making them more accessible to government and other researchers. (sub. DR105, p. 1)

The Victorian Government referred to one such initiative to highlight co-operative attempts to meet the significant data access challenges in early childhood education and care (which include Victoria not having access to Commonwealth ECEC data):

The Commonwealth Department of Education and Training and the Australian Bureau of Statistics are proactively working with States and Territories to establish an integrated data set that comprises the National Early Childhood Education and Care Collection (on preschool participation), Australian Early Development Census data, and the Australian Children's

Education and Care Quality Authority data on service quality ratings. This is an important step forward, and should be supported as the basis for establishing a broader, longitudinal and higher quality data set that can be used at all levels of government and for research more generally, subject to appropriate privacy requirements. (sub. DR144, p. 3)

Avenues to address the misaligned incentives that face education data custodians include provision of formal guidelines or directions by Australian, state and territory governments on the circumstances under which data should be provided for linkage purposes. These options are discussed in more detail in chapter 5. But as discussed in the next section, there are also legislative limits on data linkage activities particularly at the federal level. These involve restrictions on which agencies can be accredited to perform linkage services and the requirement to destroy linked datasets once a project is completed.

Nature of current data linkage arrangements

Differences in resource capacity (among other things) can affect the ability of individual jurisdictions to fund the necessary linkage infrastructure to conduct linkage projects. This is particularly the case for smaller jurisdictions. In recognition of the potential benefits available from data linkage, Australian, state and territory governments have made significant investments in linkage infrastructure in recent years which has resulted in ‘robust data linkage models that ensure the safety, privacy and security of data used in integration projects’ (AIHW 2016c, p. 6). The focus of that infrastructure development has been on the linkage of health datasets (and to a lesser extent urban development datasets), with linkage of education data much less common (table 6.2).

Linkage investment has included joint Australian and state and territory funding under the National Collaborative Research Infrastructure Strategy (NCRIS) for the development of a national data linkage network known as the Population Health Research Network (PHRN). The PHRN comprises a number of data linkage units or nodes which service each state and territory and national data linkage units which can perform State–State, Commonwealth–Commonwealth and State–Commonwealth linkages of large data collections (box 6.5). The ability to link Commonwealth data collections is technically enabled through participation by a Commonwealth accredited integrating authority — the AIHW.²³ The PHRN is based around the linkage model pioneered in Western Australia more than two decades ago (box 6.6).²⁴

²³ The ABS and the Australian Institute of Family Studies are the only other Commonwealth accredited integrating authorities approved to link Commonwealth data collections.

²⁴ NCRIS funding (as well as funding from the Education Investment Fund) has also been made available to establish the Australian Urban Research Infrastructure Network (AURIN) — a network of data providers and researchers with access to shared demographic, social, health, infrastructure and environmental datasets for the purpose of urban settlement and infrastructure research. There are no education stakeholders involved in the network (AURIN 2016).

Table 6.2 Jurisdictional linkage capability

<i>Jurisdiction</i>	<i>Data linkage node^a</i>	<i>Linked education data^b</i>	<i>Linked health data</i>
New South Wales	Centre for Health Record Linkage	No	Hospital, cancer, death, perinatal, diabetes, maternal/infant health
Victoria	Victorian Data Linkages	Yes	Hospital admissions, emergency, death, mental health, cancer, alcohol and drug use
Queensland	Queensland Centre for Health Data Services	No	Hospital admissions, perinatal, births/deaths/marriage
Western Australia	Western Australian Data Linkage Branch	Yes	Child protection, health, hospital, cancer, accident, mortality
South Australia	SA NT DataLink	AEDC, NAPLAN	Perinatal, cancer, hospital, emergency/injury
Tasmania	Tasmanian Data Linkage Unit	AEDC	Hospital admissions, emergency, perinatal, births/deaths, cancer
ACT	Centre for Health Record Linkage	No	Hospital, cancer, death, perinatal, diabetes, maternal/infant health
Northern Territory	SA NT DataLink	AEDC, NAPLAN	Perinatal, cancer, hospital, emergency/injury

^a Each of the jurisdictional nodes form part of the Population Health Research Network. ^b AEDC refers to the Australian Early Development Census. NAPLAN refers to the National Assessment Program — Literacy and Numeracy.

Source: Adapted from AIHW (2014b).

Several submissions to this inquiry raised the prospect of using the PHRN as a means of facilitating education data linkage. The submission by the PHRN (sub. 24, p. 2) itself suggested that existing infrastructure should be extended to education linkage projects:

Australia already has a national data linkage system which should be leveraged for delivery of high quality, linked education data. It is not restricted to health data. A number of education data collections including the Australian Early Development Census, NAPLAN and school enrolment data are already included in state/territory data linkage systems. If linkage variables are available there is no technical barrier to the linkage of other education data collections.

Box 6.5 **Population Health Research Network (PHRN)**

The PHRN commenced in 2009 and is funded by the National Collaborative Research Infrastructure Strategy (NCRIS). It comprises the University of Western Australia as lead agent, a centre for data linkage at Curtin University in Western Australia, a remote access laboratory located at the Sax Institute in New South Wales, and a network of project participants and data linkage units located in each state and territory (PHRN, sub. 24).

The PHRN enables researchers (in universities, government agencies, research institutes and other organisations) to access linked, de-identified data from new and existing research datasets, ad hoc survey datasets and administrative records (AGSF 2008). NCRIS funding was aimed at addressing some of the same impediments to health data linkage that exist in the education sector:

The main impediments that inhibit effective use and linkage of available health data for improving health, wellbeing and health services arise from systemic factors. These include the interpretation of legislation and policy, a lack of resources to manage data access, and researchers' widespread misunderstanding of the principles of governance for datasets containing information on individuals. (AGSF 2008, p. 2)

A major advantage of the PHRN system is that its multi-jurisdictional presence allows for data ownership to remain within the jurisdictions where it is collected. A dedicated data-linkage centre facilitates linkage between jurisdictional datasets, and between these datasets and research datasets using demographic data.

Box 6.6 **Western Australian Data Linkage System**

Western Australia has been at the forefront of data linkage for more than two decades. The Western Australian Data Linkage System (WADLS) was established in 1995 to connect available health and related information on the Western Australian population. It includes data from over 40 collections across the health, education and welfare sectors. The ability to link (identified) data at the unit record level is a noteworthy characteristic. The WADLS involves the Western Australian Department of Health, the Telethon Kids Institute, the University of Western Australia and Curtin University, and is funded by government, universities and through fee-for-service work.

The WADLS has attempted to balance open access with control of data through a number of key protocols and policies. Government agencies retain control as data custodians and provide data extracts. A data-linkage unit grants access to any bona fide researcher with a Western Australian collaborator, who has obtained approval from the relevant data custodians, and the relevant Human Research Ethics Committee(s). Furthermore, all papers prepared using linked data are provided in draft form to data custodians prior to publication, with custodians given two weeks to review and provide feedback. The WADLS has also developed a best practice linkage protocol for data sharing between Western Australian and Commonwealth owned datasets. Strict data governance arrangements have ensured no information security breaches.

Source: Telethon Kids Institute (sub. 15).

The PHRN framework was also endorsed by the Tasmanian Government in part because each jurisdiction retained control over its own data:

The [PHRN] ... provides an excellent model to achieve a structure which maintains the data in separate jurisdictions but provides file transfer infrastructure to enable cross-jurisdictional linkage for educational institutions and access for approved researchers. (sub. 75, p. 5)

However, other participants noted that effective use of PHRN infrastructure for education data was constrained by the need to create de-identified and linkable datasets on a project-by-project basis (Fraser Mustard Centre, sub. 52, p. 3). Also, some participants noted that there is no nationally consistent approach to how data linkages can occur with differing governance arrangements and release protocols used by most data custodians (Edwards and Siphthorp, sub. 73, p. 4).

Health and medical research approval processes require ethical scrutiny for each proposal to ensure the integrity of the research, and adherence to relevant guidelines and legislation. This means that it is standard practice to destroy linked data resources after each approved research project has been completed. This significantly limits the usefulness of individual linkage projects and leads to duplication in the process of constructing linked datasets, and time delays. It also means that the procedures involved in preparing linked data for use by researchers (particularly data cleaning) need to be duplicated for each research project. To put the significance of this duplication into perspective, the Commission has been told that data cleaning accounts for between 35 and 40 per cent of the total time taken to complete a research project. According to the AIHW (2016c, p. 11):

It is widely recognised that the current data sharing system which relies on once-off linkages has proven to be slow and cumbersome to the point where it has not been effective at enhancing data sharing activities.

And in an education specific context, the submission from the Fraser Mustard Centre (sub. 52, p. 3) noted that the delays and duplication involved in data linkage projects had led the South Australian Department of Education and Child Development (DECD) ‘... to establish an enduring linked dataset for several cohorts of children and young people in South Australia (rather than individual project by project)’. The South Australian DECD’s establishment of state-specific enduring master linkage keys has in effect been achieved by internalising ethical approval requirements.

The current system of data sharing (including through PHRN infrastructure) would be significantly improved and the time delays reduced if linkage keys established between datasets were retained for future use. The submission by the PHRN itself noted that while all states and territories have established enduring master linkage keys (for health data) to meet their own research needs, linkages between Commonwealth data collections are typically destroyed at the completion of each project. Enduring linkage between Commonwealth and state and territory health data collections is also rare. This adds considerably to time delays involved in linking large Commonwealth data collections (PHRN, sub. 24). The requirement to destroy datasets is not limited to health data. The *High Level Principles for Data Integration Involving Commonwealth Data for Statistical and*

Research Purposes, adopted by the Australian Government in 2010, mandate that *all* datasets resulting from linkages that use Commonwealth data are to be destroyed at the completion of projects, unless specific exceptions are put in place (CPSIC 2010). Linkage keys must also be destroyed when used to link Commonwealth data (NSS 2016).

Efforts to create enduring linked datasets between Commonwealth data collections are currently being trialled. One example is the Multi-Agency Data Integration Project which is a collaborative partnership between five Australian Government agencies: the Department of Health, Department of Social Services, Department of Human Services, Australian Taxation Office and the ABS.²⁵ While some participants voiced support for the role the ABS could play in maintaining enduring data resources (for example, QUT Faculty of Education, sub. 19) others commented that the stricter confidentiality provisions governing the ABS's activities represented a less than ideal impost on wider access to data. The Australian Curriculum, Assessment and Reporting Authority (sub. 62, p. 5) said in this respect: '... given limitations on access to data once held by the Australian Bureau of Statistics (ABS), this is not an ideal option [for an enduring data resource such as the ALLD]'

But enabling ongoing linkage between Commonwealth and jurisdictional data collections remains a significant gap in current linkage arrangements. According to the AIHW (2016c, p. 13), the development of a national master linkage key (to point to the keys already established in the states and territories) is a key piece of infrastructure needed to enable effective data sharing activities:

[A] national master linkage key ... is the central pointer that is used to pre-enable or pre-link data on the source dataset ready for sharing. A national key would contain pointers to the existing master linkage keys in each state and territory unlocking their existing data system for the management of state and territory data.²⁶

In the Draft Report, the Commission commented that data linkage systems could be improved if linked data were retained by the linking authority to avoid the inefficiency associated with reconstructing linkage keys. The Commission reached the same conclusion in the draft report for its broader related inquiry into *Data Availability and Use* where it recommended that the Australian Government should abolish its requirement to destroy linked datasets and statistical linkage keys at the completion of data integration projects (PC 2016a).

²⁵ An example of a recent Multi-Agency Data Integration Project examined the uptake of Medicare-subsidised health services amongst people on different types of Government payments, such as the Age Pension, Family Tax Benefit, and Disability Support Pension.

²⁶ The AIHW noted that a trial is already in place between the Australian, New South Wales and Victorian health departments and the AIHW to develop a master linkage key (based on the Medicare Benefits Schedule and hospital data), and demonstrate how to interact effectively with jurisdictional data systems.

The post-draft submission by the PHRN agreed with the conclusion and also supported the development of a national master linkage key (a system of continuously updated links within and between core datasets):²⁷

In the context of a linking authority, the system of data linkage would certainly be improved if linkage variables were retained by the linking authority. It would be further improved by development of an enduring national master linkage key containing pointers to existing state and territory master linkage keys. PHRN is providing funding support to AIHW to progress development of such a national master linkage key. (sub. DR110, p. 3)

The OAIC (sub. DR140, p. 11) acknowledged the efficiency benefits of moving from a 'link and destroy model' to a 'create, reuse and keep model', but cautioned that the potential benefits needed to be balanced against the privacy and security risks and those associated with future unanticipated uses of the data. It recommended that the proposal be subject to rigorous public scrutiny and consultation on how the information will be used.

As part of that process, the OAIC suggested a suite of regulatory tools be employed including a privacy impact statement to determine:

- whether privacy impacts are reasonable, necessary and proportionate
- whether de-identified data is an effective alternative to using personal information
- governance arrangements of the entity performing linkage and maintaining the dataset
- what safeguards can be implemented to make clear the uses the dataset can be put to and limit the possibility of 'function creep' as well as the controls that could be put in place around the criteria for granting access to the dataset and its security.

The approach recommended by the OAIC may go some way toward addressing the governance concerns identified in the post-draft report submission by the Queensland Government (sub. DR142, p. 10) which would, in their stead, effectively give veto rights to data custodians over linked data.

Queensland notes Draft Finding 6.1 that data linkage could be improved if linked data were retained by the linking authority. This would require clear governance around how the linking authority could use the data, with data custodians retaining ownership and control over storage, access and any proposed sharing of data provided to linking authorities.

The Australian Government Department of Education and Training (sub. DR143, p. 9) also raised concerns about retaining linked data because, as projects were unique, privacy issues needed to be addressed on a project-by-project basis. But it also said a principle to support the reuse of linked data could be adopted. Overseas models such as that operating in New Zealand were canvassed as possible avenues for investigation in that regard (discussed below).

²⁷ Data linkage can be project-based (ad hoc) or systematic. Systematic data linkage involves the maintenance of a permanent and continuously updated master linkage file and a master linkage key. Project data linkage involves the linkage of two or more data sets for a specific project, and does not involve the maintenance of a master linkage file and master linkage key (AIHW and ABS 2012).

Another participant, Ashley Craig (a PhD student with experience in working with education data) suggested that linkage should be performed by a national linking authority.

A second suggestion is that clear procedures be put in place for when sensitive data from multiple institutions across different domains (or jurisdictions) need to be linked. For example, individual students may need to be linked to incomes reported to the ATO. This does not seem to be possible with the data linkage nodes currently in existence. One possibility is that one institution could obtain access to data from the other and perform the linkage and de-identification in-house, but this relies on changes in privacy protections and high levels of cooperation from institutions that have little incentive to provide such a service. A potentially superior solution in my view would be to have a dedicated federal office in charge of linking datasets and releasing de-identified data to researchers. (sub. DR85, p. 1)

The latter suggested solution is akin to the Integrated Data Infrastructure (IDI) system operating in New Zealand (box 6.7). Under that system, Statistics New Zealand acts as the sole data integration authority. It manages a large research database holding linked longitudinal microdata about individuals and households sourced from government agencies, surveys and non-government organisations. De-identified data is supplied for bona fide research purposes deemed to be in the public interest with privacy safeguards based around the ‘Five Safes’ (box 6.4) framework and the use of privacy impact assessments (chapter 5).

Box 6.7 New Zealand’s Integrated Data Infrastructure system

Statistics New Zealand has been undertaking data integration for over 10 years – a 1997 New Zealand Cabinet directive identified Statistics New Zealand as the organisation to complete cross-agency data integration. The early integration projects were for specific purposes, often linking two or three datasets, and each project was kept in a separate environment. Complex linking work and research investment could not be easily replicated.

In 2011, the NZ Government agreed to a proposal to integrate Department of Labour migration data with the integrated datasets managed by Statistics New Zealand. As a result, Statistics New Zealand created the IDI prototype — consolidating the previously separate integration projects with the migration data. At this point Statistics New Zealand moved from one-off data integration to providing a data integration service.

In 2013, the NZ Government agreed that the delivery of better public services would be possible from improved capability across government to share data using existing datasets — for this a cross-agency data-sharing solution was required. Cabinet agreed that the IDI be expanded to facilitate this work.

Source: Statistics New Zealand (2016).

The Commission notes that New Zealand’s unitary system of government lends itself more readily to the adoption of a single national linking authority than does Australia’s federated system. In that context, recent moves to establish independent, integrated data repository and linking bodies in New South Wales and South Australia serve as examples of how enduring linked datasets can be securely established. The Commission anticipates that the future success of these initiatives is likely to see them replicated in other jurisdictions. But the current initiatives are not accessible by external researchers nor do they provide for inter-jurisdictional sharing of linked data. The development of an enduring national master linkage key will at least technically facilitate the linking of national and jurisdictional datasets at some point in the future.

More generally, allowing jurisdictional data linkage units to apply for accreditation to link Australian Government data would streamline current processes and cater for the increasing demand for such services. This reform option was a specific recommendation in the draft report of the Commission’s broader inquiry into *Data Availability and Use* (PC 2016a).

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The system of data linkage would be improved if linked data were retained and a national education master linkage key developed.

A related issue involves the cost of accessing available linkage datasets (particularly Commonwealth datasets) and whether this acts as a deterrent to, or influences the nature of, the associated research undertaken.²⁸ A submission by SA NT DataLink to the recent Senate Select Committee on Health provides an example of the costs of accessing linkage infrastructure, and the possible consequences of costs of this size:

A further factor is the cost of linking and the provision of Commonwealth data to researchers (for example, in the order of \$30,000 to \$150,000 dollars for some relatively small projects) which has resulted in the project being withdrawn or not utilising the Commonwealth data. (SA NT DataLink 2015, p. 9)

The public interest nature of health, education and other research undertaken using linkage infrastructure means that full cost recovery of access to linked datasets would likely lead to inefficient outcomes (akin to those described in the quote above) from the community’s view point. While an appropriate pricing structure would depend on the magnitude of the public interest benefits, the Commission notes that infrastructure funding provided under the NCRIS allows users access to the Secure Unified Research Environment data research laboratory within the PHRN at a level well below full cost recovery. In fact, the Commission has been told that their users are charged 30 per cent of the full costs of providing these services (Sax Institute, pers. comm. 6 July 2016).

²⁸ There are also additional charges imposed by data custodians for costs associated with maintaining, (dis)aggregating, storing and cleaning data which requires specialist expertise and infrastructure.

In contrast, the AIHW (which is an accredited integrating authority in the PHRN) recently told the same Senate Select Committee on Health:

As you may be aware, the Australian Institute of Health and Welfare receives about 30 per cent of its funding from appropriations, so 70 per cent of our revenue comes from the provision of goods and services to others. We run our data-integrating authority and data-linkage services on a cost-recovery basis. That is, essentially, the cost of a salary plus the overheads associated with running buildings (SSCH 2016b, p. 52)

Responding to the cost recovery discussion in the Draft Report, the AIHW clarified that its approach is broadly akin to charging the marginal cost for linkage services:

Although linkage services are provided on a cost recovery basis that is "*essentially the cost of a salary; plus the overheads associated with running buildings*", it may be useful to note that this should be considered at a level below full cost recovery. There are additional costs associated with linkage activities that are generally not included in this project-by-project cost recovery model. These include establishing infrastructure relating to linkage activities associated with new collections and maintaining and managing capabilities associated with running an accredited integrating authority. (sub. DR128, p. 1)

Working with diverse administrative datasets

The fragmented nature of education data collections, and the different purposes for which that data is collected, means that the definitions, metadata and other standards used in capturing that data have evolved independently (and, as a consequence, vary considerably). According to the ABS (sub. 78, p. 4):

There are a number of comparability issues in the national education and training data collections, pertaining mostly to the number of disparate systems used for data collection, variance in service starting ages (varying across jurisdictions and across sectors), and differences in scope for particular data collections. Reference periods also differ across the collections. These issues are not insignificant, where the national coherence of data is desired.

Source datasets are often not in standardised format and require substantial preparation before use (chapter 3). In particular, the nature of administrative data collections (where the primary purpose is not for research) means there is considerable effort needed to clean and prepare this data for linkage. Typically, administrative data custodians do not have the resources (including specialist expertise and infrastructure) needed, or a mandate to maintain, (dis)aggregate, store and clean data. This is in contrast to data collected by agencies such as the ABS (including survey and census data) and transactional collections (such as Medicare and Pharmaceutical Benefits Scheme data) where design features ensure higher data quality standards, including the availability of metadata, which makes linkage processes more efficient.

In its submission to this inquiry, the AIHW (sub. 55) cited a comprehensive review it recently undertook to determine the consistency and alignment of data items across 14 national education and training administrative and census data collections. The

commissioned work was conducted to enhance the comparability, quality and coherence of information collected across early childhood, school education, vocational education and training, and higher education sectors. The AIHW found that only about 25 per cent of education data items currently collected were fully consistent with endorsed national data standards in its Metadata Online Registry (even though the data was collected to agreed standards within the specific data collection). Moreover, only 6 of 11 education data collections were assessed to have the core and supplementary linkage items required to enable data linkage with other datasets (AIHW 2015a).

The implications for education and other data linkage can be significant in terms of the resources required to standardise, clean, develop and understand data after access approvals are in place. As an indication of the magnitude of the associated problems the AIHW (2016c, p. 6) has noted that the greatest delays in the linkage process stem from data preparation where data is not pre-enabled (ready to be brought together with other datasets), pre-cleaned and pre-standardised, and from the approvals required for data release.

The AIHW (2016c, p. 6) suggested that this ‘curation’ function could either be performed centrally, at source (subject to resourcing constraints) or by integrating authorities. The AIHW went on to recommend a standardised data systems approach be adopted that included the use of a number of existing pieces of supporting data infrastructure:

Greater investment in metadata and national standards will greatly assist in preparing data to make sharing and linking easier and faster. Infrastructure, such as the open release of the Geocoded National Address File (G-NAF) and AIHW’s METadata Online Repository (METeOR) provides a key role here. (AIHW 2016c, p. 4)

These issues illustrate the diverse challenges involved in working with diverse administrative datasets. Many of these challenges were encountered in the efforts by the AIHW to build a National Early Childhood Development dataset (box 6.8). The framework set out in chapter 3 provides an approach to assess the relative merits of overcoming these issues in a cost-effective manner.

Box 6.8 National Early Childhood Development dataset

In 2012 the Australian Institute of Health and Welfare (AIHW) was commissioned to develop an enduring and linked National Early Childhood Development Researchable Data Set (NECD RD) spanning 15 years of life from birth to high school.

It was intended to foster research in early childhood development, across health, human services and early childhood education and care, and to provide an evidence base on early childhood development in Australia. For each child, it would have contained information on health, development, school readiness, early childhood education and care, school attendance and educational achievements. A dataset such as the NECD RD would have had the potential to strengthen the evidence base for child development, from which sound policies and programs could be developed.

Several challenges were encountered in attempting to develop the dataset. These included privacy constraints, the ongoing nature of the dataset and incomplete data on children who did not attend preschool. Moreover, at the time, the Early Childhood Education and Care collection did not collect unit record level data for parts of Queensland, South Australia and Western Australia and in the ACT data were only collected from Australian Government preschools. This meant that information about children attending Catholic or Independent preschools was not available, and the missing unit record level data made it more difficult (if not impossible) to define information for the cohort of children who did not go to preschool.

The project is currently on hold. AIHW was negotiating agreements with each state and territory and has been awaiting further resources from the Australian Government to gain approval to procure and link data, including seeking relevant approval from state and territory ethics committees. Some organisations had indicated difficulties in providing data, but expressed support for the NECD RD.

Sources: AIHW (2014b; sub. 55).

7 Creating and using evidence

Key points

- Australia needs to invest more in creating high-quality evidence that contributes to greater understanding about what works best, for whom and in what circumstances to improve education outcomes.
 - The Commission supports investment in high-quality research, particularly randomised controlled trials in tandem with process evaluations.
- But simply creating evidence is not sufficient to change outcomes.
- Evidence needs to be used. To that end, evidence needs to be translated and communicated in ways that make it accessible to decision makers. And it needs to be implemented — it needs to change decision makers' behaviour in ways that lead to improved outcomes.
- Relatively little is known about the most effective ways of improving the implementation of evidence. Commentary emphasises the importance of partnerships, networks, engagement and support, and a culture that encourages both the creation and use of evidence.
- Developing the evidence base on how best to support the implementation of evidence and turn best practice into common practice will be as important as evaluating the impact of policies, programs and teaching practices on student outcomes.
- National policy effort is required to improve education outcomes through a bottom-up approach to developing the evidence base, including support for the:
 - development of research priorities
 - commissioning of high-quality research
 - adoption of rigorous research quality control processes
 - development of researcher capacity
 - translation, communication and implementation of high-quality education evidence.

Despite increases in expenditure on education per student over the past decade, measures of student achievement thus far show little improvement (chapter 1), and policy makers are still searching for ways to improve outcomes. Insights lie in evidence of the impact of different education policies, practices and programs (chapter 2). While there is some high-quality Australian evidence on the impact of policies, practices and programs, more is needed (chapter 3). To create that evidence, top-down monitoring and benchmarking have to be complemented by bottom-up evaluation of what works best, for whom and in what circumstances in Australian schools, classrooms and early childhood education and care (ECEC) settings to improve student outcomes. But simply creating evidence is not sufficient to improve outcomes — evidence needs to be used (chapter 3). To that end, it needs to be translated, communicated and implemented.

This chapter considers issues relating to evidence creation and use. The creation of high-quality evidence that contributes to greater understanding about what works best, for whom and in what circumstances (henceforth referred to simply as what works best) is addressed in section 7.1, and issues relating to the translation, communication and implementation of evidence are discussed in section 7.2. Institutional arrangements targeting solutions to the issues raised in this chapter are discussed in chapter 8.

7.1 Improving the creation of evidence

More research is needed

Many of the questions for which decision makers in the education system need answers are descriptive — for example, ‘how well are students performing?’, ‘how are resources distributed?’ and ‘how many students are undertaking initial teacher training?’. Questions of this type are associated with monitoring and benchmarking, or a top-down approach to data and evidence (chapter 2). Answering them typically requires large datasets and relatively simple data analysis.

Questions like ‘will the approach adopted in this successful school have a similar impact in other schools?’, ‘what effect does this program have on student outcomes?’ and ‘what approaches to engaging parents have the largest impact on their children’s outcomes?’ are about the impact of initiatives on student outcomes. They are associated with a bottom-up approach to evaluation of what works best (and what does not work) to improve outcomes. High-quality or rigorous analysis of questions like this typically requires small scale datasets that are often question specific, and sophisticated quantitative research methods because the core issue in these questions is ‘by how much has the outcome of interest changed?’. While analysis of larger datasets might suggest targets for closer examination, for example, outperforming schools or factors associated with better outcomes (like quality childcare), it cannot identify which initiatives work best to improve outcomes. (This is not to say that analysis that identifies targets for closer examination is not important. It is, and exploratory research of this type is discussed in the following section.)

A further set of questions go to why and how initiatives work. For questions of this type ‘a broad range of evidence will be useful, including observations, case studies, surveys and other qualitative research’ (Sharples 2013, p. 10).

As discussed in chapter 3, education decision makers need more high-quality Australian evidence about what works best. Inquiry participants have strongly endorsed this view, with qualifications from some about the methods used to generate that evidence. Approaches to generating evidence on what works best are described in the next section.

Research effort needs to focus on quantitative analysis of impact ...

Questions about the impact of an initiative go to how an individual's (or a group of individuals') outcomes are different as the result of being exposed to, or 'treated by', a policy, program or practice. In effect, what decision makers want to know is how the treated individual's (or group's) outcomes compare with what they would have been in the absence of the treatment. Clearly, it is impossible to observe both the effects of treatment and the counterfactual — no treatment — for the same individual (or group of individuals).

Statisticians use a range of techniques to address the lack of a counterfactual and test whether a treatment causes an outcome (box 7.1). However, these techniques are not seen as being equal in their potential to deliver high-quality evidence and hierarchies are often used to rank them. 'These hierarchies have much in common; [randomised controlled trials] (RCTs) are placed at or near the top of the hierarchy and case study reports are usually at the bottom' (Nutley, Powell and Davies 2013, p. 10). For example, in the hierarchy used by the NSW Centre for Education Statistics and Evaluation (2016c), meta-analyses of RCTs and individual trials are the gold standard. Meta-analyses of studies based on natural (or quasi) experiments and individual studies rank next, with regression discontinuity analyses typically preferred. Before and after studies rank below natural experiments, and research based on expert opinion and theoretical conjecture ranks last. Many hierarchies also rank systematic reviews highly.

... including randomised controlled trials ...

Use of research methods that provide robust estimates of the impact of policies, programs and practices, particularly RCTs, is relatively uncommon in Australian education research. As the Fraser Mustard Centre (sub. 52, p. 4) noted, '[m]uch of the research [in the education system] is qualitative in nature and does not routinely determine student level impact or outcomes'. Several inquiry participants supported the use of RCTs, in particular, to address this gap (including Ashley Craig, sub. DR85; Biddle and Breunig, sub. 25; CIS, sub. DR126; Fraser Mustard Centre, sub. 52; MCRI, sub. 47 and sub. DR92; SLRC, sub. DR93; SVA, sub. 59 and sub. DR98).

RCTs could be used to look at a very broad range of approaches to improving student outcomes. Evidence for Learning, for example, an initiative of Social Ventures Australia, is undertaking a trial in Australia of a program of professional learning for maths teachers to improve their instruction, and another on a one-on-one tutoring program for students who are low achieving in maths (Evidence for Learning nd). Speech Pathology Australia (sub. 35) highlighted three Australian RCTs on the effectiveness of interventions targeting children's competence in oral language on their literacy. Trials relating to parent engagement and strategies to support the implementation of evidence in schools are among the many RCTs set up by the UK Education Endowment Foundation (EEF ndb).

Box 7.1 **Techniques for estimating the impact of an intervention**

Randomised controlled trials

Individuals are randomly assigned to treatment and control groups before an intervention is implemented. The treatment group receives the intervention; the control group does not. If assignment is random, and the groups are sufficiently large, the average characteristics of each group should be the same. Provided the only difference between the groups is receipt of the treatment, any difference in average outcomes can be attributed to the treatment.

Natural experiments

Regression discontinuity analysis

Individuals who are very close to the cut-off point for receipt of an intervention are compared. For example, if an entry score of 90 is required to attend a selective school, the outcomes of students who just made the cut-off and those who did not can be compared to test the effect of selective schooling. The assumption is that those who are very close to the cut-off have the same characteristics on average, and luck was the only factor in determining who received the intervention. Situations that give rise to data like this occur relatively infrequently, and only for a limited range of interventions.

Difference-in-differences approach

This approach identifies a control group of individuals that is similar to the treatment group and compares the change in outcomes experienced by the treatment group with the change in outcomes experienced by the control group. This approach could be used, for example, when an intervention has been trialled in a group of schools, with comparable schools used as the control.

Matching

This approach identifies a group of individuals with similar observed characteristics to the treatment group and compares the outcomes (rather than the change in the outcomes) of the two groups. An issue with this approach is that it does not account for potential differences in the unobserved characteristics of the two groups. It is, therefore, not possible to confirm whether a difference in outcomes is due to the intervention or differences in the groups' unobserved characteristics.

Cross-section regression analysis

This approach assesses the difference in outcomes between those who received an intervention and those who did not, using regression analysis to take account of other factors that might be associated with the outcome of interest. An issue with this approach is that omission of a factor that is differentially associated with the outcome for each group will bias the measure of the effect of the intervention.

Before and after studies

This approach looks only at the treatment group and effectively assumes that the group's outcomes in the absence of the intervention would have been the same as their outcomes before the intervention. In other words, all changes in the outcome are attributed to the intervention. This is a strong assumption if there are other factors that might have affected the outcome.

Sources: Borland et al. (2004); Leigh (2009).

The potential benefits from trial insights can be significant (an example of a trial conducted in the United Kingdom is presented in box 7.2).

Box 7.2 An example of the value of trials

Teaching assistants in the United Kingdom

The United Kingdom employs about 255 000 teaching assistants at a cost of over £4 billion a year (or 10 per cent of the education budget). Evidence suggested they made little difference on average to students' achievement, but that effects varied between classrooms. In classrooms where teachers and assistants worked collaboratively together, the effects were positive. In classrooms where the assistant substituted for the teacher rather than supplementing them, students (particularly those from disadvantaged backgrounds), tended to perform worse than peers taught only by a teacher (EEF 2015a).

Since 2011, the Education Endowment Foundation has run six randomised controlled trials testing the impact of giving teaching assistants high-quality support and training in delivering structured sessions to small groups or individuals. The results showed that students of the trained teaching assistants made three to four months more progress than students whose assistants were deployed as usual. At relatively little additional cost, teaching assistants who are used effectively can have a marked impact on student learning.

That said, a number of participants raised concerns both about definitions of high-quality research and about the use of RCTs. These are discussed in more detail in appendix C, but a key point is that RCTs are not the answer in all circumstances (box 7.3).

... coupled with process evaluations ...

Some inquiry participants (ARACY, sub. DR116; AARE, sub. 22) supported RCTs but noted the importance of collecting supplementary evidence. For example, the Australian Association for Research in Education (sub. 22, p. 2) observed that:

While ... we do not dispute their [randomised controlled trials] usefulness in particular circumstances, we are also mindful of the need for research such as this to be supplemented with evidence of different kinds that attend to the local, contextual and explanatory.

There is a strong argument for process (or implementation) evaluations to be conducted in parallel with RCTs. These evaluations 'enable insights into the processes and mechanisms underpinning the impact (or lack thereof) of educational interventions' (Humphrey et al. 2016, p. 3). Questions about why, how, for whom and under what circumstances an intervention works can be addressed. A process evaluation can provide insight into what is needed to scale up an intervention and to support successful delivery. Process evaluations can be qualitative only, or involve qualitative and quantitative analysis.

Box 7.3 RCTs are not always the answer

Randomised control trials (RCTs) are not the answer in all circumstances. For example:

- if a cheaper, but equally effective, natural experiment was possible, it might be preferred over an RCT
- an existing policy, practice or program in universal use cannot be the subject of a trial because no control group can be identified
- some large-scale policy changes are difficult to trial with an RCT. Hutchison and Styles (2010) nominated the introduction of a new examination system as a policy change that would more effectively be assessed through an observational study, but noted this choice would come at the cost of being able to identify causality
- RCTs may be infeasible for some groups of students. Macquarie University Special Education Centre (sub. DR100, p. 4) noted that '[s]ingle-case experimental designs [a form of before and after study] are more appropriate in special education as students may have idiosyncratic characteristics and needs and it is difficult to recruit the large numbers needed for group designs'
- RCTs should not be used if the requirements of a rigorous trial cannot be met, for example, if it is not possible to prevent significant attrition from the trial sample. (Problems of this type, however, are likely to compromise other quantitative research methods)
- ethical concerns might prevent the conduct of a trial.

... and preliminary research to determine whether a larger-scale trial is appropriate

Social Ventures Australia (sub. DR98, p. 10) cautioned that:

Subjecting innovative practices to the rigour of a 'causal study' before its proponents have codified the key elements may kill an approach that could have great promise.

They suggest that pilot and efficacy trials should be run before a larger-scale (effectiveness) trial is implemented. Pilot trials are an opportunity to test the potential of an initiative in a small number of schools and to develop and refine both the initiative and trial approach. Efficacy trials, conducted in a slightly larger number of schools, test the impact of the initiative under ideal, or tightly controlled, conditions. Effectiveness trials then test the impact of an initiative when it is scaled up and implemented under normal conditions.

An important implication of this process is that generating evidence about the effectiveness of an initiative takes time.

Research to identify candidates for analysis of what works best is also needed ...

Some potential targets for analysis of what works best to improve education outcomes will be relatively easily identified — literacy and numeracy programs, for example, or information technologies. Others may be suggested through exploratory analysis of the relationship between an outcome of interest and the factors that might affect it.

A key requirement for this exploratory analysis is that it tests the impact of ‘within-system influences’, that is, those that can be changed by the school or early childhood education systems, or factors that affect the relationship between a within-system influence and an outcome. For example, a within-system influence might be a contributor to the quality of childcare, and the effect of quality childcare on subsequent education outcomes might be affected by a factor within the child’s home background.

Exploratory analysis might draw on large-scale national data. The Commission, for example, recently used data of this type in its study *Indigenous Primary School Achievement* (PC 2016b). That work identified a set of schools where students do better than might be expected, given their characteristics, and recommended systematic ‘under the hood’ analysis to identify the factors that might account for this outperformance.

Longitudinal datasets of the type described in chapter 3 and appendix C can also support exploratory analysis. Warren and Haisken-DeNew (2013), for example, found a significant positive association between preschool attendance and Year 3 student achievement using the *Longitudinal Study of Australian Children*. (They then tested for causality in this relationship using a matching approach.)

Exploratory analysis can also draw on smaller scale education datasets. The ABS (2016a), for example, found a negative relationship between the number of hours Tasmanian children were enrolled in preschool and developmental vulnerability in the first year of school using linked *Census of Population and Housing* and *Australian Early Development Census* data — more hours were associated with lower vulnerability.

... and would be supported by a register of education datasets and their metadata

Exploratory analysis will be constrained if information about the existence and metadata (contents and characteristics) of education datasets is not readily available.

As the Population and Health Research Network (sub. 24, p. 5) observed, ‘[e]ducation and training data collections in states and territories are diverse and generally not well documented’.

A number of inquiry participants (including Fraser Mustard Centre, sub. 52; QUT Faculty of Education, sub. DR101; Mitchell Institute, sub. DR103; NCEC, sub. DR106) supported the creation of a register of education datasets and their associated metadata. An online register of datasets could play an important role in bringing education collections to researchers’ attention and clarifying the information that could be available, particularly in administrative datasets. It would contribute to the value of data being realised:

Data are neither easy nor cheap to collect. A repository or a mechanism for easier access to existing databases would be desirable both in terms of the potential for more extensive and more useful data analyses and for greater return on the cost and effort of data collection. (LSIA, sub. 48, p. 2)

There would be advantages to the register being connected with similar resources for other sectors (MCRI, sub. DR92; Universities Australia, sub. DR121), for example, datasets about child health and the environments in which children live. These connections could be made if and when registers for other sectors are developed, as outlined in the Commission's recent *Data Availability and Use* draft report (PC 2016a).

A register need not be a costly exercise. Data custodians have information about the content and characteristics of their data. This should be attached to the register. In some cases that metadata may not be well documented, and there would be costs to data managers in creating information suitable for publication. But there would also be benefits if better documentation improved the internal management and use of the data.

The metadata could be stored at the same site as the host of the register, or remain with data custodians and linked to the register. Data custodians would need to commit to updating the publicly available metadata regularly when the underlying metadata changes.

RECOMMENDATION 7.1

The Australian, state and territory governments should ensure that a single online register of education data collections and their associated metadata is created.

Summing up

While RCTs are not always the answer, when feasible, they can be the most effective way of dealing with the challenges of establishing the impact of an initiative. Coupled with process evaluations, they have the potential to provide rigorous evidence about what works best. As the Murdoch Childrens Research Institute noted (sub. DR92, p. 7):

Done well, RCTs can achieve huge advances in promoting good outcomes for children and effective use of resources.

As discussed above, there are other high-quality approaches for measuring the impact of an intervention. If an RCT is not the answer, the evaluation method adopted has to be fit for purpose and deliver evidence of sufficiently high quality. If an approach that delivers sufficiently strong evidence of the impact of an intervention cannot be identified, scarce evaluation resources should be focused on other questions.

The Commission supports investment in high-quality research, particularly randomised controlled trials in tandem with process evaluations, to further develop the Australian education evidence base on what works best. To that end, the Australian and state and territory governments will need to work together to support the development of an infrastructure that ensures that research priorities are identified, high-quality research is commissioned and the quality of completed research is verified. It will also need to ensure that potential policy impediments are addressed.

National policy leadership is required

Australia makes a significant investment in education research. Expenditure on all education research (including post-secondary education) was about \$470 million in 2014 (ABS 2014, 2015c, 2016e). (As some inquiry participants have noted, this is lower than spending on health research, in both absolute and relative terms (box 7.4).) However, as discussed above, there is a need to devote greater effort to producing high-quality evidence about what works. In part, this need reflects the lower quality of some Australian academic research. Over 40 per cent of education research units evaluated in a recent assessment of the quality of Australian university research were rated as below world standard — the worst performance of any discipline (ARC 2015c, p. 14). In part, it also reflects limited evaluation of education initiatives. This is an issue internationally. As Claire Brown (sub. DR127) noted, the OECD observed that only 10 per cent of roughly 450 education reforms that it examined in a 2015 study (*OECD Education Policy Outlook 2015: Making Reforms Happen*) had been evaluated for impact.

There is also scope to gain greater benefit from existing research. A considerable share of the research produced, commissioned or supported by state and territory education departments has not been made public:

Many data analyses and reports are ‘fugitive’, in the sense that their existence is often not widely known, and access to them is often difficult. Their quality is also often not tested in the arena of open debate. (LSIA, sub. 48, p. 2)

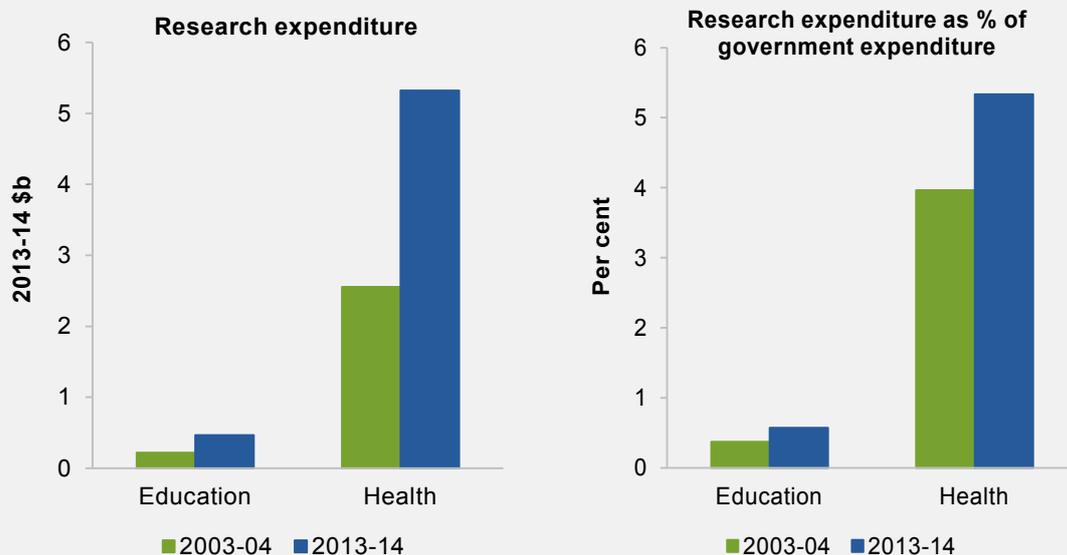
A search of some state websites adds weight to this point. The Victorian Department of Education, for example, maintains a research register. A search revealed 260 projects with a 2015 indicative completion date (VicDET 2013a). In contrast, the departmental web page titled ‘Research & Evaluation Publications’ lists 22 recent publications, with publication dates spanning 2011 to 2015 (VicDET 2016c).

That said, some states are publishing their research about what works best. The NSW Centre for Education Statistics and Evaluation is a case in point. And the Queensland Department of Education (sub. DR142, p. 1) has developed a database that ‘will house and disseminate education-related research and evaluation activity approved and/or commissioned’ by the Department. These developments are to be commended. When research is not open to scrutiny its quality is difficult to judge and the opportunity for others to benefit from the findings is missed. A lack of openness also risks the inefficient use of scarce research funding through unnecessary duplication of research effort.

Box 7.4 A comparison of expenditure on education and health research

Expenditure on health research is considerably larger than on education research, both in absolute terms (reflecting, at least in part, the higher costs of medical research) and relative to government expenditure on services. Not surprisingly, businesses and private non-profit organisations accounted for a much larger share of expenditure on health research — about 35 per cent in contrast with about 13 per cent for education. The source of these research funds is unknown. Some would have been provided by governments through consultancies and research grants. Others would have been funded by donations or by the organisations themselves — a more likely scenario in health. The vast majority of expenditure on education research (83 per cent) was undertaken by higher education organisations, in contrast with just over 50 per cent for health. (Governments were responsible for the remaining expenditure in each sector.) In both sectors, research expenditure more than doubled in real terms in the decade to 2013-14, and grew faster than government expenditure.

Research expenditure in health is much larger than in education^{a,b,c}



^a Data on research expenditure cover expenditure by higher education organisations, businesses, private non-profit entities and the Australian, state and territory governments. Data on expenditure only cover operating (education) or recurrent (health) expenditure by the Australian, state and territory governments. Private expenditure is not included. ^b Research expenditure data for private non-profit entities and governments are for 2002-03 and 2012-13. ^c Data on education research cover all education sectors, including early childhood, schools and tertiary education. Data on government expenditure cover operating expenses for preschool, school and tertiary education. They do not include early childhood education and care other than preschool.

Sources: Research expenditure — ABS (*Research and Experimental Development, Businesses, Australia, 2013-14*, Cat. no. 8104.0; *Research and Experimental Development, Higher Education Organisations, Australia, 2014*, Cat. no. 8111.0; *Research and Experimental Development, Government and Private Non-Profit Organisations, Australia, 2012-13*, Cat. no. 8109.0); Government expenditure — ABS (*Government Finance Statistics, Education, Australia, 2013-14*, Cat. no. 5518.0.55.001); SCRGSP (2016a).

National policy leadership is needed to build the Australian evidence base on what works best. Through that policy leadership, Australian, state and territory governments should seek to put into effect the National Education Reform Agreement clause to:²⁹

... work together to develop, publish and disseminate evidence on what works best in schools
... including by researching, sharing and evaluating improvement and innovation strategies.
(COAG 2013, p. 10)

In developing this policy, governments should ensure that evidence about what works best is decoupled from ECEC service or school funding formulas. Similarly, to encourage engagement by practitioners, involvement in creating evidence about what works best should be decoupled from performance assessment. The aim, in developing the evidence base, should be to promote a culture of continuous improvement. Service providers and their staff should be encouraged to engage in creating and using evidence, and supported to implement new initiatives. For example, tying Australian government funding to states and territories to new evidence about what works best, or mandating that an initiative must be used, risks disengagement from the process of building and using evidence.

In addition, as a number of inquiry participants pointed out (including NCEC, sub. DR106; SVA, sub. DR98; Universities Australia, sub. DR121), in building evidence about what works best, the capacity and capabilities of Australian organisations should be leveraged. There is expertise, and relevant research undertaken in, the non-government education sectors, state and territory education departments, the university sector and the not-for-profit sector. Nationally-led efforts to build the evidence base should seek to leverage and complement these other efforts (Queensland Government, sub. DR142). And practitioner engagement in research through communities of practice will be valuable (VCOSS, sub. DR141, pp. 16–7):

The ‘bottom-up’ approach should encourage professionals and local communities to gather robust data and evidence, such as in trials and small scale samples, to supplement the evidence base. Evidence generation should not be limited to government agencies and research bodies.

An education evidence infrastructure is needed ...

In the following discussion of the range of activities needed to build high-quality evidence, three Australian organisations (the National Centre for Vocational Education Research (NCVER), the Australian Housing and Urban Research Institute (AHURI) and the National Health and Medical Research Council (NHMRC)) and two international agencies (the Education Endowment Foundation (EEF) in the United Kingdom and the Institute of Education Sciences (IES) in the United States), are used to illustrate the types of approaches that might be adopted.

²⁹ There are currently two education agreements in force: ‘Queensland, Western Australia and the Northern Territory operate under the NEA [National Education Agreement] in agreement with the Commonwealth. ... New South Wales, Victoria, South Australia and the Australian Capital Territory operate under the NERA [National Education Reform Agreement] in agreement with the Commonwealth.’ (DPMC 2016, p. 22)

... to identify research priorities ...

Concerns about quality and relevance have led some OECD countries to be quite prescriptive, through priority setting, about the foci for government-funded education research. In response to widespread criticism of academic research, the United Kingdom established an independent body in 1999, the National Education Research Forum, to develop a national research strategy, including priorities (Gough 2013). Although the Forum was defunded in 2006, research priorities for education and children's services are now published by the UK Department for Education, and guide the commissioning of research (UKDfE 2014). A key priority — raising the attainment of socioeconomically disadvantaged children, particularly through literacy and numeracy initiatives — led to a grant in 2011 of £125 million to the EEF. The Foundation anticipates spending £200 million over 15 years on rigorous project evaluations (EEF 2016a).

In the United States, the agency with primary responsibility at a federal level for education research is the IES within the Department of Education, which was established in 2002 in response to concerns about the quality of education research. The US *Education Sciences Reform Act 2002* that established the Institute requires it to identify research priorities.

National research priorities are used in other sectors in Australia. In vocational education and training (VET), for example, the first national research strategy was published in 1997 'to ensure the findings of VET research and evaluation can help various stakeholders in the VET system make better decisions to improve the quality and effectiveness of training' (Robinson 1997, p. 2). Research funding allocations are still guided by national research priorities (NCVER 2016). Similarly, in housing, research priorities guide the research program administered by the government-funded AHURI (nd).

All of these agencies engage in consultation with research consumers and producers in developing priorities.

A number of inquiry participants have advocated a national education research strategy (for example, RIPPLE, sub. 45; MCRI, sub. 47; Mitchell Institute, sub. 31). Setting priorities would be a core element of such a strategy. In addition, the terms of reference for the Education Ministerial Council (the Education Council) that were approved by COAG in November 2015 include development of a research plan, which would presumably include priorities. As Social Ventures Australia (sub. DR98, p. 3) noted, 'a national set of "common research priorities" should complement state based and school system level research'. The Queensland Department of Education, for example, has an annual research plan and priorities (sub. DR142).

The Commission supports the development of research priorities in ECEC and school education. Decision makers within the education system, researchers and the broader community should be consulted during the development of these priorities.

... commission high-quality research ...

In pursuit of high-quality evidence, agencies in some countries prescribe the types of techniques that should be used for government-funded education research, and have rigorous project selection processes. The EEF, for example, advises applicants that it will work with them to ensure that funded evaluations are robust, and that the majority of funded evaluations are RCTs (EEF nda). Initial applications are screened by EEF staff. An independent evaluator and EEF staff then work with shortlisted applicants to develop a detailed project plan and costing. Applications are then considered by a grants committee before a final funding recommendation is made.

The EEF also requires that all projects collect data on the cost per pupil involved in a trial and that project plans state how these costs will be evaluated (EEF 2015b). Data on costs enables comparison of the cost-effectiveness of an initiative, and identification of initiatives that lead to the largest improvements in achievement at lowest cost.

In the United States, applicants seeking IES funding for projects that assess the impact of initiatives to improve outcomes, are advised to:

... use study designs that will yield impact estimates with strong causal validity and that, for example, could meet What Works Clearinghouse standards without reservations. Generally and when feasible, they should use designs in which the treatment and comparison groups are randomly assigned. (IES 2013, p. 21)

Applicants for exploratory research grants are advised that their projects must analyse primary or secondary data and result in a conceptual framework. The framework has to either identify the relationship between a within-system influence and an outcome, or between the influence and factors that mediate or moderate that relationship, or have both of these characteristics (IES 2014).

Grant applications are assessed through a process of scientific peer review similar to processes used by the US National Institutes of Health (SRO nd). Reviewers, with strong track records in producing quality research, assign scientific merit scores to proposals. These are used to identify top ranked applications for further consideration by panels of reviewers.

Closer to home, the Australian Research Council and the NHMRC, for example, use peer review processes in allocating research funding.

The Commission supports the commissioning of high-quality education research. A rigorous process should be adopted for project selection, including the provision of guidelines to applicants about the sorts of research that will be considered. The guidelines should also require assessment of initiatives' cost-effectiveness. Given limits on education budgets, evidence for decision makers about what works best to improve outcomes needs to be prioritised on the basis of cost-effectiveness.

... and verify the quality of the research

As the Australian Research Alliance for Children and Youth (sub. DR116, p. 13) noted, '[w]hen it comes to improving outcomes the quality of available evidence is at least as important as quantity'.

A range of processes can be used to ensure that completed research is robust. These include independent project evaluation, peer review of research outputs, publication of all outputs (irrespective of findings) to enable scrutiny and debate, and the provision of project data for secondary analysis. The publication of all outputs is also essential because classroom and educator time is precious. It is important that things that do not work make way for things that do, so all research findings should be completely open and transparent.

Processes like these are used by the EEF and IES.

In the case of the EEF, evaluations of both the impact and process of an intervention are conducted by an independent evaluator (Humphrey et al. nd). (The process evaluation examines how an initiative was implemented and the contributors to successful or unsuccessful delivery.) In addition: project findings are verified through secondary data analysis commissioned by the Foundation; all evaluations are made public, whatever the result; academics are encouraged to publish evaluations through peer review processes; and all project data are made available to researchers for secondary analysis.

In the case of research funded by the IES, the US *Education Sciences Reform Act 2002* requires peer review of all research, statistics and evaluation reports conducted or supported by the Institute (SRO nd). In addition, since 2012, grant recipients have had to submit peer reviewed publications to the Education Resources Information Centre, an online research repository sponsored by the Institute. In 2013, the Institute began to implement a requirement that project data be made available for secondary analysis (IES 2012).

Research commissioning bodies in other sectors in Australia, like the NCVET and AHURI, use some of these processes.

The Commission supports the adoption of rigorous quality control processes for research that contributes to understanding about what works best to improve outcomes. The processes should include peer review, publication of all outputs and provision of data for secondary analysis by other researchers.

Potential impediments include ...

... researcher capacity ...

Does Australia have the research capacity to build high-quality evidence on what works best in education? Input from some inquiry participants suggests not. For example, the

Fraser Mustard Centre (sub. 52, p. 4) noted that:

In the education system there is a lack of research capacity to conduct high quality rigorous research that can help inform policy making.

And Professor Julianne Moss from the Australian Association for Research in Education commented that '[i]t's well known that we do not have a large number of people working in Australia who have quantitative expertise in educational research' (trans., p. 30).

On the other hand, Social Ventures Australia (sub. DR98) noted that Evidence for Learning established a panel of eight evaluators with experience in running RCTs in education settings. But they also supported the further development of capacity across the research sector to avoid a concentration of expertise and over-reliance on a single institution.

The evidence suggests that investments in capacity building are needed to develop the pool of researchers with skills in high-quality research techniques. As Universities Australia (sub. DR121, p. 4) observed, '[o]ur current research training system could do more to develop education researchers with high-level data skills ...'. Overseas, both the EEF and IES support capacity building. The EEF has developed resources for evaluators, and the process of evaluators working with project teams leads to knowledge and skills transfer. The IES funds PhD and post-doctoral programs and short courses for researchers and statisticians.

The Commission notes that Australia will need to invest in researcher capacity to undertake high-quality education research. Strategies should be put in place to build this capacity.

... and the potential costs of RCTs

RCTs may cost more than is typical for education research projects. In 2014-15, the EEF awarded grants totalling £12.1 million (about \$21 million) to 24 projects, or an average of just over £500 000 per project (about \$880 000) (EEF 2015c). In contrast, the UK Department for Education spent £5.9 million on about 80 projects, or an average of about £74 000 per project (UKDfE 2015). In July 2016, the National Center for Education Research within the IES announced funding of about US\$105 million (\$140 million) for 57 projects (NCER 2016). Of these, 24 projects aimed to test the efficacy of an initiative using RCTs or natural experiment approaches. Most of these projects each received about US\$3.3 million (\$4.4 million). In contrast, exploratory and measurement projects typically received about US\$1.4 million (\$1.9 million) each.

In Australia, the average Australian Research Council grant in 2014-15 was about \$480 000 (ARC 2015a), and a search of the grants dataset using the term 'education' suggests that education-related projects tend to receive less than this (ARC 2015b).

Some inquiry participants (Biddle and Breunig, sub. 25; SVA, sub. 59; EEF, sub. DR97) emphasised that use of administrative data can reduce the cost of trials. Treatment and control groups need to have similar characteristics, for example, location, prior education

achievement and socioeconomic status. Information of this type is often held in administrative datasets, and access to it would reduce the costs of identifying random samples of students. Administrative data that include information on student learning outcomes could also be used in evaluating the effectiveness of interventions, thus reducing trial costs. The EEF (sub. DR97, pp. 5–6) reported that:

... [we] would not be as effective and efficient as we are, nor would we be able to track the longer term impact of our work as well, without the National Pupil Database ...

The National Pupil Database contains administrative data covering students' location, school, attainment on national tests and key demographic characteristics.

There can be difficulties in accessing administrative data in Australia — these issues are discussed in chapters 5 and 6.

While RCTs may be more costly than other forms of education research, they also have the potential to be of much greater benefit. On the basis of this type of research, decisions can more confidently be made to discontinue, or not roll out, ineffective programs and the extension of cost-effective initiatives can be supported. This means education expenditure can be used more effectively and efficiently. As the Behavioural Insights Team in the UK Cabinet Office (Haynes et al. 2012, p. 16) suggested:

Rather than considering how much an RCT costs to run ... it might be more appropriate to ask: what are the costs of not doing an RCT?

And evidence from the United Kingdom suggests that the benefits of trials can be significantly higher than their costs (EEF, sub. DR97, p. 1):

Analysis undertaken by the English Department for Education found that the direct lifetime productivity gains for pupils receiving EEF interventions [the majority of which are RCTs], before accounting for the significant benefits of our dissemination and mobilisation work, will amount to three times the costs of running and evaluating those interventions.

Australia's experience of reform effort without improvements in achievement suggests that the costs of not having a high-quality evidence base are substantial.

7.2 Improving the use of evidence

Simply creating evidence is not enough. Evidence will only lead to improved education outcomes if it is accessible to decision makers and if it is implemented — that is, it changes decision makers' behaviour. There are barriers to the use of evidence, contributing to its underuse. This is a critical issue. As the Victorian Council of Social Service (sub. DR141, p. 19) noted, '[d]ata and evidence is of little value if it does not translate into policy and practice'. To improve education outcomes, best practice needs to become common practice. To that end, in addition to supporting the creation of more high-quality evidence on what works best, the Australian and state and territory governments will need to work together to ensure that evidence is translated, communicated and implemented.

Barriers to evidence use confront ...

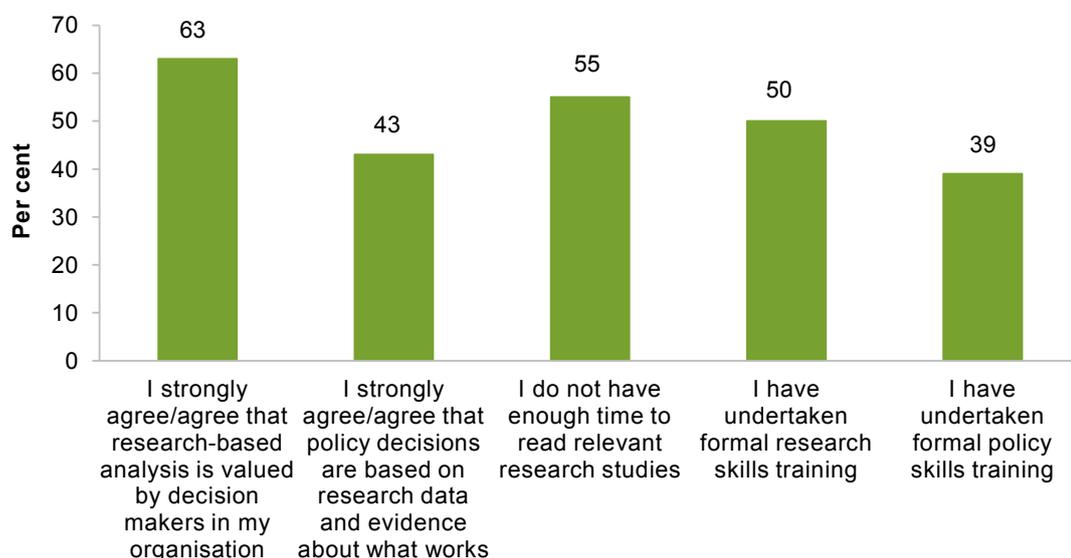
... policy makers ...

Head (2015) identified a number of potential barriers to the use of evidence in policy making, including the absence of a supportive culture and practices within government agencies. He suggested that research is not always highly valued, with academic work sometimes seen as irrelevant or not timely. In addition, ‘poor management of information, weak senior commitment to analytical skills, and low ability to partner with external groups’ (p. 479) hinder evidence use. Weak networks and communication channels between researchers and policy makers were identified as barriers — effective engagement and partnerships matter to both the creation and use of high-quality evidence. Finally, he noted that an insufficient supply of high-quality evidence impedes the use of evidence.

Education department staff surveyed as part of a study of the impact of social science research on policy decision making in Australia (ISSR 2016) provide insights into the prevalence of some of the barriers identified by Head (2015) (figure 7.1). The study was motivated by the observation that:

Academics lament that policy-makers ignore their research, while policy decision-makers argue that academic research is largely irrelevant to their needs. (ISSR 2016, p. 1)

Figure 7.1 Use of evidence in Australian education departments^a



^a Survey responses from staff in policy, planning and research, evaluation and data analysis functions in education departments in New South Wales (65 staff), Victoria (384 staff) and Queensland (70 staff).

Source: Ferguson and Head (2015).

... educators ...

Inquiry participants identified a lack of leadership and cultural and institutional support as potential barriers to the use of evidence (and changes in practice) by education providers and their staff:

We need effective teachers and leaders to drive the change agenda ... Effective school leadership is essential. If the school leader does not have the capacity and skills to implement policies and programs in the context of the school that they lead, then it is destined for failure. (ASPA, sub. DR119, pp. 3–4)

For evidence to be taken seriously there have to be receptive users and a willingness to change existing practices if evidence supports the need. Both require cultural and institutional support; without that support, evidence that challenges the status quo will be dismissed. (ARACY, sub. DR116, p. 4)

Other barriers identified included practitioners' beliefs and behaviours (box 7.5), and inadequate analytical skills, training and resources.

Box 7.5 Practitioner beliefs and behaviours that act as barriers to evidence use

Social Ventures Australia (sub. 59) identified a number of practitioner beliefs and behaviours that act as barriers to the use of evidence.

Unhelpful beliefs include that:

- the context in which they work is completely different from the one in which a practice was found to have impact, so the practice will not have the same impact for them
- the practice will be no more effective than what they are doing (coupled with change fatigue that means they are unwilling to try something new).

Behavioural barriers include:

- that it is easier to rely on ingrained habits and routines
- a lack of time to try something new
- that the practice is far too difficult to implement
- giving up early because of concerns that they are not implementing the practice correctly and do not know if it is having any impact.

Skill gaps among teachers in collecting and using data have been identified as a key issue limiting the effective use of formative assessment in Australia (CESE 2014b; Goss and Hunter 2015). Principals also have concerns. In a 2013 survey, principals rated only 23 per cent of recent primary, and 32 per cent of recent secondary, teacher graduates as either very well or well prepared to make effective use of student assessment information (McKenzie et al. 2014). This commentary suggests that a lack of skills may be a barrier to evidence use for some teachers.

Some inquiry participants (for example, Telethon Kids Institute, sub. 15; Minderoo Foundation, sub. 27; MUSEC, sub. DR100, SVA, sub. 59; APPA, sub. 64), suggested that it might be difficult for teachers to acquire the necessary skills in using evidence. The Telethon Kids Institute (sub. 15, p. 16) noted that:

Undergraduate teaching courses for example, do not enable teachers to understand how to interrogate evidence to determine its quality and relevance to their context and the education system has limited embedded analytic capability and financial support to enhance the research capabilities of teachers and other school staff.

And the Macquarie University Special Education Centre (sub. DR100, pp. 5–6) cited evidence from a survey of 15 universities that indicated that ‘pre-service teachers cannot discriminate research-based practices from non-research-based practices and tend to rate all practices as equally effective’.

Finally, accessing evidence and determining a course of action on the basis of that evidence take time. Finding time among the other demands placed upon them is a challenge for educators — a point made, for example, by the Independent Education Union of Australia, Queensland and Northern Territory Branch (sub. 21).

... and parents

For some parents, gaps in their own education might mean that finding and interpreting the evidence they need to effectively engage in their child’s learning is difficult. Related to this point, Hattie (2009) noted that some parents cannot speak ‘the language of schooling’ and that this can be a major barrier to them making a contribution to their child’s achievement.

More generally, difficulty in identifying high-quality evidence might be a barrier for parents. The Parenting Information Project — a study of the information that parents want and need to support them in parenting — concluded that, although there was a lot of information available on parenting:

There are difficulties ... around identifying which information is evidence-based and quality assured, and where to access information. (DFaCS 2004, p. xi)

Similar comments might be relevant to information specifically about education.

The education evidence infrastructure also needs ...

... to translate and communicate evidence ...

The barriers described above suggest that a focus on translating and communicating evidence in ways that identify high-quality evidence and make it easily accessible for decision makers is essential. All of the bodies discussed in section 7.1 engage in some activities to translate and communicate research findings.

The EEF summarises findings from both EEF-funded and other high-quality research within two ‘toolkits’ — one for school education, and one for early years education. Indicators of the cost, evidence strength and impact of interventions within different topic areas are available at a glance on the toolkit homepages. Clicking through on a topic yields more detail, including practice resources for educators. (Evidence for Learning, supported by Social Ventures Australia, provides an Australian version of the toolkit (SVA 2016).) The IES oversees the What Works Clearinghouse, which reviews research on policies, programs, practices and products in education. Evidence is summarised using effectiveness ratings for different interventions and practice guides (IES 2016b). In addition to the Clearinghouse, as noted above, the IES sponsors an online research repository, the Education Resources Information Centre.

Of the Australian agencies, the NCVER publishes an annual research summary and AHURI publishes policy briefs. The NHMRC goes further, summarising research findings in practice guidelines.

A number of inquiry participants including the Australian Council for Educational Research (sub. 32), the Smith Family (sub. 60) and the Grattan Institute (sub. 61) called for a clearinghouse for high-quality evidence. The Australian Council for Educational Research (sub. 32, p. 4) noted that an evidence base:

... comprising scientific evidence is important to improve outcomes in Australian education. In this context, the ‘Evidence for Learning’ initiative of Social Ventures Australia (<http://evidenceforlearning.org.au/>) to make evidence about what works and why more widely available to schools and education systems is a commendable development.

Some inquiry participants noted the value of translating and communicating materials beyond summaries of research findings. For example, the Victorian Council of Social Service (sub. DR141, p. 19) submitted that:

Clearly communicating evidence to education and community service professionals can help overcome their time and resource shortages. Information presented in jargon-free, easily understood formats, can identify tangible actions, including outlining effective strategies and interventions in different circumstances. Developing practical tools and resources for professionals, such as practice guides, helps translate this evidence into practice.

While many sources of education evidence exist (chapter 3 and appendix C), a central repository of trusted, high-quality evidence, which includes resources to support practitioners, is a key input to ensuring decisions are informed by the best available evidence. The repository should aim to make evidence accessible to decision makers at all levels of the education system. It should translate and communicate high-quality evidence from all sources, not just evidence gained through research commissioned against national priorities. It should also aim to complement work being done to translate and communicate high-quality evidence by other organisations (for example, the Teaching & Learning Toolkit managed by Evidence for Learning (SVA, sub. DR98) and the What Works for Kids database being developed by the Australian Research Alliance for Children and Youth (sub. DR116). Any guidelines developed relating to an initiative should be accompanied by a

message that emphasises that they are guidelines only and may need to be adapted to reflect local circumstances.

The Commission supports a central clearinghouse that efficiently and effectively translates and communicates high-quality evidence, making it accessible to all decision makers. The clearinghouse should become a high profile, central, trusted source of high-quality Australian education evidence, and should include resources for practitioners.

... and support the implementation of evidence

Efforts to translate and communicate evidence will only impact on student outcomes if they change decision makers' behaviour. Making evidence available is important, but to improve outcomes, evidence needs to be implemented. Concerns that evidence does not sufficiently impact decision making have emerged in many countries and subject areas, and have given rise to 'an exploding field of interest' (Levin and Cooper 2012, p. 17) — knowledge mobilisation, or research into how to ensure that decision makers implement evidence and that evidence mobilises changes in behaviour.³⁰

Generally, knowledge mobilization seems to be about active engagement of diverse public users of research results — engagement that extends beyond 'traditional' forms of academic dissemination such as journal articles directed towards academic readers. Outcomes of this engagement should then mobilize the public to become research users, and mobilize impact or visible change among these research users. (Fenwick and Farrell 2012, pp. 2–3)

In Australia, our understanding of what works best to mobilise knowledge and change decision makers' behaviour is in its infancy (chapter 3). As Polesel (2013, p. 105) noted in a study of knowledge mobilisation in Australian education research:

The mobilization of knowledge generated by educational research has yet to be coherently conceptualized, and its frameworks, processes and outcomes are rarely investigated.

Commentary about the factors that contribute to the implementation of evidence emphasises the importance of partnerships and networks, practical support for decision makers and the engagement of decision makers in evidence creation (box 7.6). A supportive culture is also held to be important.

Recent initiatives both overseas and in Australia are contributing to a greater focus on the impact of evidence, and to evidence about the most effective ways of supporting the implementation of evidence and ensuring that best practice becomes common practice.

In the United Kingdom, for example, the impact of research by UK higher education institutions on the wider community was assessed in 2014 through the Research Excellence Framework (HEFCE 2016). And, also in 2014, the UK Government allocated £1 million to

³⁰ Terms more commonly used in Australia for knowledge mobilisation include knowledge transfer, knowledge exchange, knowledge utilisation and engaged scholarship (Polesel 2013). Other terms for the same concept include implementation science and improvement science.

the EEF for research into how high-quality evidence can be most effectively converted into changes in the classroom (EEF 2014). At least four projects have been initiated.

Box 7.6 Approaches to supporting the implementation of evidence

Partnerships and networks, engagement and support are themes in commentary about ways to support the implementation of evidence and change decision makers' behaviour.

In terms of policy makers, engagement, communication and interaction between researchers and policy makers is thought to be an important factor in encouraging the implementation of evidence in decision making (Head 2015, p. 477).

In terms of practitioners, Social Ventures Australia (sub. 59, p. 45) commented that:

... (1) evidence needs to be actively worked into authentic professional networks, and (2) in order for evidence to be used to best effect, system leaders must invest in building the capacity of teachers and school leaders to do so.

According to a US study (Neuhoff et al. 2015), educators' networks can be used to increase demand for evidence, as can support for educators in their selection of interventions.

The Australian Secondary Principals Association (sub. DR119) emphasised the importance of support for educators to adopt and adapt evidence into their practice because programs are not always transferable, and contextualised solutions are needed.

The Victorian Council of Social Service (sub. DR141, p. 19) noted that support can come from experts and peers ... :

Local practice experts can work with schools or ECEC providers to interpret research and translate its findings. Facilitating communities of practice for collaborative professional learning, sharing best practice and lessons learnt can further assist.

... and that engaging practitioners in the research process will support the implementation of evidence and changes in practice (p. 20):

Change is made easier by establishing collaborative relationships with educators. Engaging educators in identifying data and evidence of most benefit to their work, and prioritising research helps build a shared vision of progress.

In Europe, the European Commission has funded projects on the links between education evidence and policy making, and the Evidence Informed Policy and Practice in Education in Europe Network is continuing work on this topic (EIPPEE 2011).

In the United States, the Carnegie Foundation and the William T. Grant Foundation are investing in ways of improving the implementation of evidence in education settings. The Carnegie Foundation is encouraging the development of Networked Improvement Communities — partnerships between researchers, practitioners, students, content experts and designers that focus on integrating evidence and practice. Educators are seen as being active inquirers and 'need to engage fully with researchers and others in developing, testing, and enhancing the clinical work of schooling' (Bryk 2015, p. 473). The model supports the sharing of information across schools and school districts, and the scaling up of successful practices (Senechal 2015). More generally, US research funders are increasingly interested in research impact.

In Ontario, the Literacy and Numeracy Secretariat employs highly skilled and experienced educators to work with schools to build capacity and implement strategies to improve student achievement (VCOSS, sub. DR141). The educators also provide schools with information about education policies and programs, and work with them to build partnerships, including with teachers' federations and research organisations.

In Australia, there is growing research interest in how to mobilise knowledge. A process for assessing the impact of research undertaken by Australian higher education institutions is being developed and will be piloted in 2017 (DET 2016h). As noted above, a study has looked at the impact of social science research on policy decision making, including within education (ISSR 2016). And researchers at Monash University have been undertaking a pilot study into the use of evidence in education policy in Victoria (Rickinson 2014).

Work of this type is encouraging, but a great deal remains to be discovered. In developing the Australian education evidence base, research on how best to effect the implementation of evidence will be as important as evaluating the impact of initiatives on student outcomes. As Social Ventures Australia (sub. 59, p. 17) noted:

Substantial effort needs to be directed to understanding and responding to the ways in which frontline professionals best engage with data and evidence to lift their impact and thereby improve educational outcomes.

FINDING 7.1

The value of education evidence will only be realised if it is translated into common practice. Developing the evidence base on how best to support the use of evidence to turn best practice into common practice, is as important as evaluating the impact of policies, programs and practices on student outcomes.

In conclusion

A better understanding of what works best to improve the impact of education evidence will likely have widespread implications on, for example, the way researchers interact with decision makers, educators are trained and work, and education policy is designed. It will also help ensure that spending on both education and education research is effective and efficient.

It will take time to identify research priorities, commission and complete evaluation projects, translate and communicate research findings, and for evidence to be implemented and best practice become common practice. And it will take a further period of time before the impacts of these efforts become apparent in nationally reported outcomes.

RECOMMENDATION 7. 2

The Australian, state and territory governments should pursue a national policy effort to develop a high-quality and relevant Australian evidence base about what works best to improve early childhood and school education outcomes and to support the use of that evidence. In particular, five activities need to be supported:

- development of research priorities
- commissioning of high-quality education research
- adoption of rigorous research quality control processes
- development of researcher capacity
- translation, communication and implementation of high-quality evidence.

8 Governance and institutional arrangements

Key points

- Appropriate governance and institutional arrangements are essential for the implementation of the bottom-up approach to a national education evidence base, focused on evaluation of what works best to improve student outcomes.
- There are many organisations responsible for education-related data collection, sharing, monitoring and reporting in Australia. None is uniquely responsible or accountable across jurisdictions for evaluation and implementation of what works so that best practice becomes common practice.
- This is a barrier to the effective implementation of the bottom-up approach to a national education evidence base.
- The Australian, state and territory governments should lead the way by formally committing to a shared and co-operative approach to policy leadership.
- This commitment should be demonstrated through a National Education Evaluation Agreement that is separate to existing agreements, decoupling the implementation of the top-down from the bottom-up approach.
- The Agreement should provide explicit policy directions that define the:
 - objectives of the Agreement
 - nature of the research to be undertaken in the bottom-up evaluation of what works and what does not work, including research on the best implementation strategies, process evaluation and assessment of cost-effectiveness
 - evidentiary standards or frameworks to be applied, and quality verification processes
 - imperative to ensure effective translation and communication of evidence, and its implementation, including through guidelines accessible to practitioners.
- The Australian Curriculum, Assessment and Reporting Authority (ACARA) should be assigned responsibility and accountability for delivery of the bottom-up functions. It is recommended that a separate division of ACARA be established for this purpose to reinforce the decoupling of the top-down and bottom-up functions.
- The cost of these institutional arrangements is expected to be met from within the existing budget envelope (and funded by all governments), using a model based on the current framework for funding ACARA.

The framework set out in the preceding chapters for further developing a national education evidence base is not the end of the journey. Effective governance and institutional arrangements are important to create strong incentives for delivery on the goal of a national education evidence base to improve education outcomes in a cost-effective manner.

Many agencies are involved in collecting data on early childhood education and care (ECEC) and schools, and in performing a wide range of other functions. For national top-down functions (monitoring, benchmarking and reporting), effective policy, governance and institutional arrangements for school education are already in place — with the Australian Curriculum, Assessment and Reporting Authority (ACARA) having prime responsibility.

In recent years a number of institutions have started undertaking some education research of the required kind (chapter 7), but it is being done in an ad-hoc and largely unguided way. Relying on existing education research arrangements has not delivered the type of education research being recommended by the Commission for the bottom-up capability of the national education evidence base (henceforth referred to as the bottom-up approach). To move in the recommended direction, specific and effective institutional and governance arrangements are needed. This is to ensure that the policy functions are clearly articulated and agreed to, and that the tasks associated with implementing the outlined framework are clearly assigned, thereby promoting accountability.

The purpose of this chapter is to:

- review the governance and institutional arrangements of agencies that have key roles in ECEC and school education (section 8.1)
- review the governance and institutional arrangements of agencies (in Australia and internationally) that provide insights and examples of how the bottom-up functions could be implemented (section 8.2)
- recommend a way forward for the implementation of the bottom-up approach (section 8.3).

8.1 Existing governance and institutional arrangements

The institutional arrangements governing national education policy, data and evidence creation reflect the federated and multi-sector nature of Australia's early childhood and school education systems. A number of institutions exist at the national and state levels. Their roles and responsibilities are connected and coordinated through various inter-jurisdictional agreements, protocols and frameworks overseen by the Council of Australian Governments (COAG) and the Education Council (EC).

Education Council

The COAG EC is a Ministerial Council with representation from the Australian Government and all states and territories (New Zealand is a non-decision making member). Each jurisdiction can be represented by a maximum of two ministers with portfolio responsibility for ECEC, school education and/or higher education. Each jurisdiction nominates a Senior Minister as the representative on the Council (COAG 2014).

The EC provides a forum through which strategic policy on ECEC, school education and higher education (including vocational education and training) is coordinated at the national level. It also provides the vehicle through which information is shared, and resources used collaboratively, to address (in ECEC and school education) issues of national significance, including development of an evidence base.

The scope of the EC's responsibilities are set out in its terms of reference provided by COAG and summarised in box 8.1.

Box 8.1 Scope of the Education Council's responsibilities

The Education Council will:

... assist the Council of Australian Governments (COAG) through national collaborative action to improve educational outcomes for all Australians, across all stages of the learning and development lifecycle. COAG Councils are responsible to COAG and will be engaged in work requiring COAG's attention.

By connecting early childhood, school education and higher education, the Council aims to ensure that integrated Australian education systems seamlessly promote high achievement for all students regardless of circumstances.

The Council will further collaborate to develop a research plan, and improve the evidence base, to inform policy development and priorities, and progress greater linkages of data through the life course to better understand education outcomes and productivity for all Australians ...

The Council's work program will include its existing responsibilities under Commonwealth and State legislation, National Agreements, National Partnerships and any other governance arrangements, including national education architecture ...

Additionally, it will ensure performance information is in place to monitor the outcomes and address data gaps.

Source: COAG (2014).

Australian Education Senior Officials Committee

The EC is supported by the Australian Education Senior Officials Committee (AESOC) — senior officials with responsibility for ECEC, school education and higher education. In turn, AESOC is supported by subgroups, including the Schools Policy Group, the Early Childhood Policy Group and the Data Strategy Group (DSG). The DSG reports to, and provides advice to, AESOC about how data can be improved to inform policy development and priorities, and facilitates linkages of data through the life course to better understand education outcomes and productivity for all Australians (DET, sub. 68).

Australian Curriculum, Assessment and Reporting Authority

ACARA is a statutory authority established under the *Australian Curriculum, Assessment and Reporting Authority Act 2008* (Cwlth). ACARA reports to, and receives directions from, the EC. The Board has 13 members (nominated by the EC) representing the Australian

Government and all education sectors (government, Independent and Catholic) across the states and territories. ACARA has consultative arrangements with AESOC and others.

ACARA is responsible for the:

- national curriculum from Foundation Year to Year 12 in specified learning areas
- national assessment program aligned to the national curriculum that measures progress of students
- national data collection and reporting program that supports analysis, evaluation, research and resource allocation
- accountability and reporting on schools and broader national achievement (ACARA 2016a).

Some of the functions specified in ACARA's charter include:

- collection, management and analysis of student assessment data and other data relating to schools and comparative school performance
- facilitation of information sharing arrangements between Australian government bodies in relation to the collection, management and analysis of school data
- publishing information relating to school education, including information relating to comparative school performance
- providing information, resources, support and guidance to the teaching profession (SCSEEC 2012).

Under its charter, ACARA is also directed to work closely with Education Services Australia (ESA) and the Australian Institute for Teaching and School Leadership (AITSL) to provide innovative and cost-effective services across all sectors of education.

In terms of the Commission's framework for further developing the national education evidence base, ACARA facilitates the monitoring, benchmarking and performance reporting (top-down) function for school education.

Australian Children's Education and Care Quality Authority

The Australian Children's Education and Care Quality Authority (ACECQA) is a statutory authority established under the *Education and Care Services National Law Act 2010* (Cwlth). It oversees the implementation of the National Quality Framework and works with the state and territory regulatory authorities to implement and administer that Framework. Its Board is appointed by and is accountable to the EC, and it reports to the Council through AESOC.

The EC's priorities and expectations for ACECQA are set out in a Letter of Expectation. ACECQA's roles are to:

- implement changes that benefit children from birth to 13 years of age and their families
- monitor and promote the consistent application of the Education and Care Services National Law across all states and territories
- support the ECEC sector to improve quality outcomes for children (ACECQA 2016a).

Education Services Australia

ESA is a national, not-for-profit company established under the *Australian Charities and Not-for-profits Commission Act 2012* (Cwlth) and is owned by all education ministers (Australian, state and territory governments). The Board of ESA includes representatives of the Australian Government, AESOC, the non-government schools sector, Universities Australia and a range of independent experts. The priorities for the company are outlined in a Letter of Expectation from the EC.

The role of ESA is to:

- advance key nationally-agreed education initiatives, programs and projects by providing services such as:
 - researching, testing and developing effective and innovative technologies and communication systems for use in education
 - devising, developing and delivering curriculum and assessment, professional development, career and information support services — consistent with the work of ACARA, AITSL, states and territories and other key stakeholders
 - facilitating the pooling, sharing and distribution of knowledge, resources and services to support and promote e-learning, across jurisdictions, sectors and internationally
 - supporting national infrastructure to ensure access to quality assured systems and content and interoperability between individuals, entities and systems
- create, publish, disseminate and market curriculum and assessment materials, ICT-based solutions, products and services to support learning, teaching, leadership and administration (ESA 2015).

Other key bodies

Australian Institute for Teaching and School Leadership

AITSL is a non-profit company (funded by the Australian Government) established under the *Corporations Act 2001* (Cwlth) that aims to promote excellence in teaching and school leadership. The Australian Government Minister for Education and Training is the sole member of the company.

It operates under its own constitution, with decisions taken by an independent board of directors, who are appointed by the Minister. The AITSL Board includes representatives of government, universities, non-government schools, school principals and other experts (AITSL 2015a). Board members have diverse professional expertise in education practice and research. AITSL has a number of consultation groups including a teaching qualifications, teaching expert, school leadership expert and teacher education expert committee (AITSL 2015a).

In 2009, 2012 and 2013, AITSL received a Letter of Expectation from the then Education Minister setting out work priorities and expectations. In 2014, the then Minister sent a Letter of Instruction to the Chairman, and this was translated into AITSL's Statement of Intent (Commonwealth of Australia 2014). While the Letters of Expectation and Statement of Intent are in the public domain, the Letter of Instruction is not.

AITSL's Statement of Intent identifies three ways of working within their focus areas (initial teacher education, school leadership and teaching):

- policies and resources — developing national policies and high-quality tools and resources to support improvement in teaching and school leadership
- partnerships — working in partnership with schools, higher education providers, systems, sectors and other organisations to develop, disseminate and implement AITSL's work
- research — developing a research plan, commissioning and conducting research on issues relating to its mission and encouraging other researchers and organisations to add to the evidence base (AITSL 2015d).

Across the three focus areas their role includes:

- supporting the regulatory authorities in each state and territory to ensure that consistency is maintained in the national process of accreditation across both teaching and school leadership and initial teacher education programs
- advancing the quality of teaching and school leadership in the education sector — including developing and promoting the *Australian Professional Standard for Principals* and the *Australian Professional Standards for Teachers*
- developing and maintaining national approaches to improve the quality of initial teacher education — including developing a new approach to accrediting initial teacher education programs (the *Accreditation of Initial Teacher Education Programs in Australia: Standards and Procedures*) (AITSL 2015a).

They are also the designated authority under the *Migration Regulations 1994* (Cwlth) for assessing school teacher occupations for the purposes of skilled migration (AITSL 2015a).

AITSL undertakes some of the functions outlined in chapter 7 regarding the evaluation of what works. However, unlike ACARA (which performs the top-down monitoring role), AITSL does not operate under the umbrella of COAG and the EC. It does work closely

with the EC, other government organisations (for example ACARA, ESA and ACECQA) and jurisdictional regulatory authorities.

Other Australian, state and territory government departments and agencies

The Australian, state and territory governments establish departments to provide policy, funding, and administrative and reporting oversight of early childhood and school education systems, within their respective areas of responsibility. Some of these departments include dedicated units with reporting and data analysis roles, such as the NSW Centre for Education Statistics and Evaluation.

State and territory governments also have authorities (generally known as Curriculum, Assessment and Certification Authorities), whose responsibilities include curriculum development and senior secondary assessment and certification.

Non-government schools and early childhood education provider representation

Non-government (Catholic and Independent) schools and ECEC providers are represented nationally through groups such as the National Catholic Education Commission (with a range of state and territory affiliates and diocesan offices) and the Independent Schools Council of Australia (although this is a representative organisation rather than a formal structure and not all Independent schools are members). The non-government sector is also represented in the advisory structures of institutions such as ACARA and the DSG.

A gap in the existing institutional arrangements

The existing institutional arrangements largely focus on top-down aspects of the evidence base — monitoring, benchmarking and performance reporting. Most education data in Australia are collected for performance monitoring purposes (chapter 3) and there is a gap in the evaluation of what works best to improve education outcomes (chapters 3 and 7) — that is, evidence generated primarily through a bottom-up approach.

This gap is also apparent in current institutional arrangements. ACARA, for example, focuses on reporting school education data (for monitoring purposes) at the national, state and territory level through the *National Report on Schooling* and at the school level through the *My School* website (appendix C). Likewise, the ABS compiles the *National School Statistics Collection* and the *National Early Childhood Education and Care Collection* (appendix C). Data are made available by governments and institutions in various ways for research purposes. However, co-operative and coordinated support across jurisdictions for development of the bottom-up evidence base for ECEC and school education is not substantially reflected in the current institutional architecture. Effective national arrangements are not in place for the bottom-up approach.

8.2 Examples of bottom-up institutions

When considering the type of institution that could perform the role of the bottom-up approach, it is useful to examine the governance and institutional arrangements of existing institutions that undertake similar functions. In this section, we survey institutions that undertake some of the roles and functions as outlined in chapter 7 for the implementation of the bottom-up approach in the education sector.

Some participants in the inquiry have pointed out a number of organisations that do some of the functions outlined in chapter 7 in relation to education research (for example Mitchell Institute, sub. 31; ACER, sub. 32; The Smith Family, sub. 60; Grattan Institute, sub. 61; SLRC, sub. DR93; NCEC, sub. DR106). Others (Fraser Mustard Centre, sub. 52; DET, sub. 68; NT Government, sub. 77), provided examples of institutions undertaking similar roles in the health sector.

Table 8.1 summarises a number of institutions according to the functions they perform. It is important to note that the list is not intended to be exhaustive. Instead, it provides a number of examples of institutions in Australia and overseas that undertake some of the roles and functions of the bottom-up approach. The Commission acknowledges there is a large number of organisations in Australia and overseas (not listed in the table) that undertake education research more generally and perform some of the roles and functions of the bottom-up approach.

UK Education Endowment Foundation

The Education Endowment Foundation (EEF) is one model of an institution run at arm's length from government. The EEF was established in 2011 through charities legislation in the United Kingdom to enhance education outcomes for disadvantaged children. The UK Government called for tenders to run the EEF and provided an endowment (a founding grant of £125 million), which, with investment and fundraising income intends to award as much as £200 million over the 15-year life span of the Foundation.

The EEF is an independent charity and its Board of Trustees — four of whom are nominated by the successful tenderer Sutton Trust and three by Impetus Trust³¹ — have discretion as to how the organisation meets its charitable objects. The EEF has an 11 member advisory panel, drawn from education, public policy and business to provide insight and advice to the trustees and the executive team. The EEF's approach of separating research and review processes (chapter 7) provides a rigour that is not necessarily achieved by research organisations that combine the two processes (notwithstanding the quality of the work).

³¹ A philanthropic organisation now known as Impetus PEF – following the merger of Impetus Trust (founded in 2002) and the Private Equity Foundation (founded in 2006).

Table 8.1 Summary of selected bottom-up institutions in education
Australia and overseas

Institution	Functions ^a				
	Funds and commissions others to do research	Undertakes research themselves	Commissions independent reviews of research	Translates ^b and communicates evidence	Assists in the implementation of evidence
UK Education Endowment Foundation ^c	✓		✓	✓	✓
US Institute of Education Sciences	✓		✓	✓	✓
NZ Iterative Best Evidence Synthesis Programme ^d				✓	✓
Evidence for Learning ^c	✓		✓	✓	✓
NSW Centre for Education Statistics and Evaluation		✓	✓ ^e	✓	
Australian Institute for Teaching and School Leadership	✓		✓	✓	✓
Australian Council for Educational Research ^c		✓		✓	✓
National Centre for Vocational Education Research	✓	✓		✓	
Science of Learning Research Centre		✓		✓	✓
Learning Sciences Institute Australia		✓		✓	

^a Not all of the functions listed are desirable in a proposed bottom-up institution. ^b The nature of the translation of evidence varies across institutions, for example the use of guidelines versus toolkits. ^c Non-government owned. ^d Uses *Guidelines for Generating a Best Evidence Synthesis Iteration* to generate the *Best Evidence Syntheses*. The Guidelines are developed by the NZ Ministry of Education with input from researchers and other key stakeholders. The methodology is designed to be fit for purpose and undergoes a formative quality assurance process. ^e Some evaluations are undertaken by independent external consultants while others are conducted in-house.

The EEF:

- aims to raise the attainment of children facing disadvantage by identifying and funding education innovations that address the needs of disadvantaged children in schools
- shares and promotes the use of evidence in schools by providing independent and accessible information through the Sutton Trust-EEF *Teaching and Learning Toolkit* and the *Early Years Toolkit* summarising the stock of educational research from the United Kingdom and around the world

-
- provides a resource for school leaders and policy makers to inform decision making in schools (EEF 2016c).

In March 2013, the EEF and the Sutton Trust were jointly designated by the UK Government as a What Works Centre for improving education outcomes for school-aged children. It is now one of seven What Works Centres in the United Kingdom. The network of What Works Centres help to ensure that thorough, high-quality, independently assessed evidence shapes decision making at every level, by:

- collating existing evidence on the effectiveness of policy, programs and practices
- producing high-quality synthesis reports and systematic reviews in areas where they do not currently exist
- assessing the effectiveness of current policies and practices against a set of objectives
- sharing findings in an accessible way
- encouraging practitioners, commissioners and policy makers to use these findings to inform their decisions (UK Cabinet Office 2015).

The EEF works in partnership with funding partners to help finance projects and advocate organisations who can lead and encourage the use of evidence in schools through a range of engagement activities (EEF 2015a).

US Institute of Education Sciences

The Institute of Education Sciences (IES) was established under the *Education Sciences Reform Act of 2002* and is the research arm of the US Department of Education. Some of its key characteristics are its independence from government, technical expertise, and central roles in supporting policy-relevant research, evaluation and dissemination.

The operations of the IES are overseen by the Director and a technical board (Kuenzi and Stoll 2014). The Director of the IES (who has expertise in education research, statistics or evaluation) is appointed by the President, with consent from the Senate. The Director's duties include proposing research priorities, establishing procedures for technical and peer review and ensuring the independence of the Institute.

The National Board of Education Sciences (a technical panel composed primarily of researchers) has a number of responsibilities, including advising the Director on the policies of the IES and grant applications, and approving research priorities and procedures for review. The Board also assesses the progress of the IES and makes recommendations for improvement.

The IES covers education from ECEC to post-secondary study. It is authorised to:

- award grants to support technical assistance and evaluation (including training to implement programs and dissemination activities) and grants to develop statewide longitudinal data systems
- conduct the *National Assessment of Educational Progress* — a National Assessment Governing Board formulates assessment policy guidelines (Kuenzi and Stoll 2014).

The IES consists of four centres (each with a different purpose, including both top-down and bottom-up functions) and houses the What Works Clearinghouse where certified (external) assessors review evidence in terms of the effectiveness of programs, policies or practices using a consistent and transparent set of standards, and summarise the results. The Clearinghouse does not evaluate the research undertaken; instead, this is done by one of the four centres within the IES (IES 2016a).

Evidence for Learning — Social Ventures Australia

Social Ventures Australia (SVA) is a not-for-profit private organisation established under the Corporations Act focusing on overcoming disadvantage in a number of areas including education. It has initiated the *Evidence for Learning* program, by providing funding, capability building and access to networks. The program is supported by founding partners (the UK EEF and the Commonwealth Bank of Australia) and SVA works with other partners to improve education outcomes for Australian children (SVA, sub. 59).

The program provides:

- a *Teaching and Learning Toolkit* (a free online summary of global educational research on approaches to lift learning outcomes in schools) delivered at a cost of less than \$1 million per annum (SVA, sub. 59)
- a *Learning Impact Fund*, under which SVA pairs programs in schools with experienced independent evaluators to conduct rigorous research to assess the impact of the program on learning.

The Evidence for Learning program is supported by:

- a Steering Group, that has representatives from the founding partner organisations
- an Expert Reference Council, that comprises of experts in education, school improvement and equity (including government and non-government organisations)
- a Research Use and Evaluation Committee, to provide technical expertise in the fields of school evidence and research (Evidence for Learning 2016).

8.3 The way forward

The Australian, state and territory governments should lead the way

To support the further development of the bottom-up approach, effective governance and institutional arrangements will have to be established. Two key steps are required:

- a national policy roadmap should be developed
- an institution should be assigned responsibility and accountability.

A National Education Evaluation Agreement is needed

In Australia's federated system, responsibility for the funding and delivery of education services is predominantly spread between the Australian, state and territory governments, and education services are delivered by government and non-government sector providers.³² Hence, the system has agreements and institutions that facilitate tiers of government and sectors to work together.

Given this environment, all governments need to be involved in developing policy to support the bottom-up approach and in driving its implementation. Commitment from each jurisdiction will create incentives for delivery on the goals of the bottom-up approach, and a shared and co-operative policy effort will enable the greatest benefits to be realised from its implementation.

Existing agreements focus on either early childhood or school education. The bottom-up approach should cover both levels of education. Synergies between the sectors support a cross-sectoral approach. In addition, the activities required to support the creation and application of high-quality evidence are similar in the two sectors, meaning it would be cost-effective and efficient for one institution to be responsible for implementation of the bottom-up approach across the two sectors. These factors suggest that a new, cross-sectoral, Agreement is appropriate.

This Agreement could be created by expanding the coverage of the *National Education Agreement* (or the *National Education Reform Agreement*).³³ However, as the Queensland Government (sub. DR142, p. 12) noted, that Agreement has a broader remit than data and research activities and:

Combining both early childhood education and care, and school education, in a single agreement would have a range of consequences that are beyond the scope of this inquiry.

Furthermore, negotiation of the national agreement is closely associated with the allocation of funding. There are strong arguments for decoupling funding arrangements for ECEC and

³² In some states, local governments also play a role in the funding and delivery of ECEC services.

³³ As noted in chapter 7, there are two national education agreements in force, covering different jurisdictions.

schools, and the top-down approach of monitoring, benchmarking and accountability, from the bottom-up approach (EEF, sub. DR97; SVA, sub. DR98). Policy makers, researchers, and educators should view the bottom-up approach through the lens of how to go about improving outcomes rather than through the top-down perspective of informing judgements about their performance (NCEC, sub. DR106). In this way, incentives are created for all stakeholders to embrace and engage with the evidence-based approach. Thus, there is a further case for the creation of a new, stand-alone Agreement.

As an alternative to adding ECEC to the *National Education Agreement*, the Queensland Government (sub. DR142) suggested that the scope of the national information agreements could be expanded to include research. (The current agreements focus on data sharing.³⁴) Along similar lines, the Australian Government Department of Education and Training (sub. DR143) suggested the development of a national information agreement to support both better evidence and data sharing. As set out in this report, sharing data is an essential element in advancing the bottom-up approach. However, the activities associated with the bottom-up approach are significantly different from those relating to improving data sharing. And current agreements have the drawback that they focus on issues related to ECEC and schools, respectively, and do not focus on the important elements of the bottom-up approach set out in chapter 7.

The Commission recommends that a new, stand-alone, cross-sectoral agreement should be established — the *National Education Evaluation Agreement*. In developing it, as ACECQA (sub. DR108, p. 4) submitted, there should be:

... careful consideration of the functions and roles of existing national agreements and Education Council bodies to avoid duplication of effort and resources, and to ensure alignment and effective cooperation among stakeholders.

In addition, reflecting discussion in chapter 7, the Agreement should:

- recognise, and seek to complement, research undertaken by government and non-government education authorities and the university and not-for-profit sectors
- be long-term in nature, given that the time-frames required to build evidence through the bottom-up approach are significantly longer than the cycles of typical education agreements
- explicitly decouple the bottom-up approach from performance assessment in order to encourage service providers and practitioners to engage in creating and using evidence, and to adopt a culture of continuous improvement.

Finally, the Agreement should embody the principles of good governance (box 8.2).

³⁴ The *National Information Agreement on Early Childhood Education and Care* was developed to ‘facilitate and improve the collection, sharing and reporting of early childhood education and care information’ (SCSEEC 2014, p. 1). And the DSG is developing a *National Schools Information Agreement*, with the aim of addressing barriers to data sharing (ISCA, sub. DR138).

Functions of the *National Education Evaluation Agreement*

The Agreement should provide explicit policy direction in defining the:

- objectives of the Agreement
- nature of the research to be undertaken in the bottom-up evaluation of what works and what does not work, including research on the best implementation strategies, process evaluations and assessments of cost-effectiveness
- evidentiary standards or frameworks to be applied, and quality verification processes
- imperative to ensure effective translation and communication of evidence, and its practical application, including through guidelines accessible to practitioners.

Box 8.2 Principles of good governance

Accountability and responsibility

Accountability is achieved when decision makers are assigned functions, held responsible for their decisions and actions and submit themselves to external scrutiny. It is important that all parties have clearly defined roles and a clear understanding of their responsibilities.

Governments can contribute to improved accountability by:

- setting clear policy objectives
- providing policy guidelines and clearly defining the functions of the agency or entity responsible for delivering on the bottom-up approach.

Transparency

Transparency is required so that the community can determine whether they have confidence in the decisions and actions taken by governments and public sector agencies in relation to the national education evidence framework. Transparency has been an important element of recent reforms in education, including the *Smarter Schools National Partnerships*, *National Curriculum*, *National Assessment Program — Literacy and Numeracy*, and the *My School* website.

Capability

Government entities require appropriate resourcing and capability to carry out their functions effectively (this includes financial resources and suitably skilled staff).

An institution to deliver the bottom-up approach is needed

An institution should be assigned responsibility for the functions needed to deliver on the bottom-up approach. The following discussion describes these functions, presents three options for the institution, outlines desirable characteristics for the institution and assesses the options against those characteristics.

Functions and operations of the institution

The institution should be responsible for the five activities set out in Recommendation 7.2, that is, the:

- identification of research priorities
- selection and funding of proposals for evaluation, through competitive tendering. The institution would not undertake research on its own account — ‘as this expertise exists across a large number of organisations and sectors’ (MCRI, sub. DR92, p. 8). Research proposals, consistent with agreed priorities, could come from diverse sources, such as schools, ECEC services, research institutes, and community and charitable organisations
- commissioning of independent reviews of research findings, and ensuring required standards of evidence are maintained in evaluations and reviews
- translation of research findings into information accessible to all education decision makers, including practical guidelines and toolkits, and promotion and support for the development of a culture of using the evidence base. Communication of findings would also include information about what does not work. The institution would also review and translate research findings from other researchers, where these meet the required evidentiary standards
- facilitation and development of researcher capacity.

As discussed in chapter 7 — a supportive culture, partnerships and engagement are important factors in the use of evidence; opportunities exist to leverage the capabilities and capacities of other organisations in developing evidence about what works best; and a register of datasets and their associated metadata would contribute to realising the value of education data holdings. Accordingly, the institution should also be responsible for:

- promoting a culture among policy makers and educators of applying the evidence base
- establishing partnerships between research institutes, schools and ECEC providers, and educators, as a means to achieve engagement and buy-in
- establishing partnerships with private philanthropic organisations, both in Australia and overseas, to leverage the growing interest and support for generating and applying high-quality evidence in education
- keeping researchers informed about potentially useful administrative and other datasets, including through provision of a register of education data collections and their associated metadata.

In undertaking its functions, the institution should operate with open and transparent processes, including by:

- consulting widely on research priorities and methods of operation
- publishing all of the work that it commissions, even where the results are inconclusive or initiatives are found not to work

-
- releasing data from evaluations for secondary analysis.

Three options for housing the institution

Inquiry participants generally supported the Commission's draft report proposal for an institution to be assigned responsibility for performing the functions needed to deliver on the bottom-up approach. However, many noted the significant number of institutions already in place (including DET, sub. DR143; NCEC, sub. DR106; ACECQA, sub. DR108). There was little appetite for a new institution. In addition, the costs of establishing a new institution are likely to be high, and setting up and building confidence in a new institution would take time. As ACECQA (sub. DR108, p. 4) submitted:

... in the interests of efficiency and minimising establishment costs, an existing institution [should] be considered for this role, rather than creating a new stand-alone organisation.

A number of inquiry participants (including EEF, sub. DR97; Ladwig, sub. DR137; Howell, sub. DR117; SVA, sub. DR98) also emphasised the importance of the institution being independent from government. Howell (sub. DR117, p. 1) submitted that:

Having an independent institution to determine the worthiness of specific research projects and to disseminate research findings has the potential to profoundly influence both teacher knowledge and student outcomes ... The institution's decision making must function independently of state, territory and national education departments.

The EEF (sub. DR97, p. 3) reported a number of benefits from its experiences of operating at arms-length from government, including an ability to be objective and to develop trust among practitioners:

While we are cognisant of the priorities of policymakers and practitioners ... we have no vested interest in a particular programme or approach. We stand by the results of our trials whether positive, negative or neutral — and publish all results, even if those may challenge prevailing orthodoxies or policy positions ...

... Our independence ... separates us from the high-stakes accountability and regulatory frameworks of government. This sympathetic positioning has practical benefits: it helps recruitment to our trials and assists with the dissemination and mobilisation of our knowledge, as we are seen as a trusted brand, not an ideological vehicle.

As a general rule, evaluation of any activity should be separated from the organisation responsible for funding and delivering that activity in order to avoid potential or perceived conflicts of interest. With this in mind, the Commission strongly recommends that the institution be established at arms-length from government departments and authorities and non-government bodies responsible for delivery or oversight of ECEC and school services — an outcome that could be achieved through housing it in an independent statutory authority or a private entity.

These considerations conditioned the three options contemplated for housing the institution:

- ACARA's role could be expanded — functions associated with the bottom-up approach could be added to its existing responsibilities for the top-down approach for school education.
- AITSL's role could be expanded to include responsibility for the bottom-up approach.
- A privately run institution could be created through a competitive tender process, similar to the way in which the UK EEF was established.

If AITSL was given responsibility for the bottom-up approach, it would be desirable for it to become a statutory authority, like ACARA, with functions clearly set out in legislation. The provision of direction through a Letter of Instruction that is not in the public domain means that AITSL's governance is not sufficiently transparent if it is to take on responsibility for the bottom-up functions. Furthermore, AITSL's ownership structure means that it is not sufficiently at arms-length from government. Retention of AITSL as a company owned by the Australian Government Minister for Education could give rise to perceptions that its functions and operation could too readily be influenced by government through administrative procedures.

Desirable characteristics of the institution

Given Australia's federated system, and the functions described above, the institution will ideally:

- have operational independence from government
- be accountable to the EC
- be required to operate with a high degree of openness and transparency
- have considerable scope to raise direct funding (donations) from private philanthropic and corporate sponsors, and to leverage external funding for individual evaluation projects
- have significant capacity to enter into partnerships with government organisations, schools, ECEC service providers, educators and research institutes
- have minimal costs of establishment and ongoing operation
- be able to manage risks arising from conflicts of interest between its existing and new functions.

Assessment of the options against the desirable characteristics of the institution

Operational independence from government

Both ACARA and AITSL would have operational independence from governments. If one of these organisations was given responsibility for the proposed bottom-up functions, that

independence could be further strengthened through oversight by a Board. This Board would comprise of independent education expertise through Directors appointed in their personal capacity, and not include public servants from education and ECEC departments, nor serving officers from the non-government early childhood or school education sectors. Furthermore, the Board should report directly to the EC. As ACECQA (sub. DR108, p. 4) noted:

... the right governance relationships will be those that strike an effective balance between securing the interests of all government partners, while not limiting adaptation and responsiveness.

Representatives of government bureaucracies and non-government sectors could contribute to the institution's governance through advisory structures reporting to the Board.

A number of inquiry participants strongly supported the creation of avenues that would enable other groups of education decision makers to contribute to the governance of the bottom-up approach — including peak parent organisations (APC, sub. DR133), practitioners (APPA, sub. DR89; IEUA, sub. DR109), school instructional leaders (AHISA, sub. DR94), and university researchers (Universities Australia, sub. DR121).

Representatives of these groups could also have a voice in governance processes through the advisory structures.

By design, contracting a private entity to undertake the bottom-up functions would create an institution that is operationally independent from government. Contractual arrangements would specify that the institution should consult with different groups of education decision makers.

Accountability to the Education Council

Similar accountability mechanisms could be established for each option. In the case of ACARA, current arrangements for provision of strategic direction — through legislation and a charter — could be extended to cover the bottom-up functions, as could ACARA's reporting requirements. Similar arrangements could be used if AITSL became an independent statutory authority. In the case of the private entity, accountability could be established through provision of strategic direction through the entity's contract, along with requirements for regular reporting and review, and the prospect of the contract being terminated. However, setting an institution outside the ambit of the EC, coupled with the potential for it to receive funding from other sources, may weaken incentives for it to be responsive to the EC's direction. In other words, there is a risk that the accountability mechanisms may be less effective in the case of the private entity.

As an additional mechanism to support adherence with the EC's strategic direction, the Commission proposed in its draft report that the EC should have the right of veto over a proposed piece of research, provided that the power is exercised transparently. Some inquiry participants had reservations about this suggestion. The Murdoch Childrens

Research Institute (sub. DR92, p. 9), for example, argued that:

This allows the possibility of research projects being evaluated with a political lens, which will not always be in the best interests of Australia's children, or health and education system.

There is a risk that the Institute's concern will be realised. But there is also a risk of the institution losing focus. The Commission, therefore, maintains that the EC should have a right of veto, provided the EC makes a clear case, in writing, and that the case is publicly disclosed by the institution.

Openness and transparency

There is no clear evidence that supports one option over another on this characteristic. Similar levels of disclosure, along with adherence to standards around transparency of processes, could be required in each case. Procedures to create openness and transparency could be enshrined in the institution's charter/contractual arrangements. Similar requirements relating to publication of full research results, making data available for secondary analysis and being open and transparent (for example, in relation to partnership arrangements and project selection and review) could be established under each option.

Scope to raise revenue (donations) from private philanthropic and corporate sponsors

Both ACARA and AITSL would face constraints in raising revenue from donations because, in maintaining their statutory requirements, they must be free from the consequent obligations that such funding may either impose or be perceived to impose. Furthermore, private philanthropic and corporate organisations may be less willing to make donations because ACARA and AITSL are government agencies.

A private entity would be able to better leverage the growing interest and support for generating and applying high quality evidence in education from third parties. As SVA (sub. DR98) noted, an organisation outside government is likely to have fewer constraints on its ability to seek this funding. The experience of the EEF (sub. DR97) has been that its governance model enables freedom to attract further funding. The EEF's establishment under charities legislation, independence from government and provision of a 15 year endowment, coupled with the expectation that it would raise funds from donations, have supported its fundraising. Work undertaken by the SVA has demonstrated that it is possible to attract philanthropic funding in Australia. Another example is research into the impact of an arts education on school attendance and achievement commissioned by the Song Room (sub. DR148) and supported by the Macquarie Group Foundation.

Scope to leverage external funding for individual evaluation projects

On the other hand, there is no apparent advantage to any particular option in relation to leveraging external funding as a contribution to the cost of an individual project.

Whichever institution is assigned responsibility for the bottom-up approach should be able to commission projects (through a competitive process), and project proponents should be able to bring funding to the table from other sponsors and collaborators.

Capacity to enter into partnerships with government organisations, schools, ECEC service providers, educators and research institutes

Similarly, there is no clear evidence that one organisation should be preferred over another on the grounds that it would be better able to develop partnerships with other organisations. It is expected that the institution will develop and facilitate partnerships that enable other organisations to undertake research that falls within the agreed priorities.

Relatively low costs of establishment

Of the three options, housing the institution within ACARA would likely be the least expensive to establish.

As noted above, AITSL is currently a public company limited by guarantee and has one shareholder. Legislation would be required to convert it into an authority, like ACARA, owned by the EC. While amendments to ACARA's legislation would be needed to enable it to undertake the functions associated with the bottom-up approach, these would be comparatively straightforward.

Tendering for a private entity would likely incur larger costs, relative to amending ACARA's legislation. The tender documentation would have to be written, applications would have to be assessed (including due diligence checks on tenderers) and a contract would have to be settled with the successful bidder.

Relatively low costs of ongoing operation

There is no clear evidence that one organisation should be preferred over another on the basis that it would have lower operating costs.

Both ACARA and AITSL would provide the back office functions for the new activities, leveraging economies of scale. And there would also be synergies from being able to move staff flexibly across these organisations' different functions.

Irrespective of which organisation is assigned responsibility for the bottom-up approach, its funding should be independent from the general cycle of education funding. As the EEF (sub. DR97, p. 4) observed, its 15 year endowment has provided financial security, enabling the organisation to focus on its primary task and avoiding the need to 'devote significant effort to ensuring the organisation's own survival year-on-year'.

In practical terms, in the case of ACARA, existing funding arrangements could be extended, and expanded, to cover the new functions. AITSL's funding arrangements would have to be amended. And in the case of a private entity, funding for operations would reflect the agreed tender price by the winning bidder. Each of these options would involve similar ongoing costs of operation.

Scope to manage risks arising from conflicts of interest between the existing and new functions of the organisation

Locating the institution in ACARA may give rise to a potential or perceived conflict of interest with ACARA's existing functions. For example, a bottom-up evaluation could raise questions about an aspect of ACARA's top-down functions. Furthermore, stakeholders might perceive that the top-down and bottom-up approaches had not been decoupled and be less willing to engage with ACARA on one or both of them. To deal with these issues there would have to be structural separation between the bottom-up and top-down functions. Separate divisions responsible for each approach could be created.

The division responsible for the bottom-up approach would need its own Board, which would report to the EC. To ensure independence, this Board should have no common membership with the existing ACARA Board, but the CEO would cover both streams of work and would be an ex-officio member of each board. This arrangement would have some parallels with the Reserve Bank of Australia's two boards (box 8.3). A separate advisory structure for the bottom-up activities would also be required and this could be configured to ensure the participation of organisations that are not represented on the Board.

Box 8.3 Reserve Bank of Australia governance structure

The bank is managed by a Governor and has two Boards: the Reserve Bank Board and the Payments System Board. The Reserve Bank Board has responsibility for monetary policy and financial stability, while the Payments System Board has responsibility for matters relating to payments system policy, including regulatory responsibilities. Both boards are chaired by the Governor. The Reserve Bank Board consists of three ex-officio members and six non-executive members appointed by the Treasurer (RBA 2015b). The Payments System Board consists of the Governor, one representative of the Reserve Bank of Australia, one representative of the Australian Prudential Regulation Authority and up to five other members appointed by the Treasurer (RBA 2015a). If there are inconsistencies in a policy across the two boards, the Reserve Bank Board's policy prevails (RBA 2015a).

AITSL's Board includes representatives of some of the organisations that would have a potential or perceived conflict of interest if they were directly involved in governance of the bottom-up approach. Therefore, it would be desirable to either restructure the Board, or establish an additional Board, with both reporting to the EC. Advisory structures would be required in either case. The first option might restrict decision making around the organisation's existing remit. AITSL also holds responsibility for assessment under the

Migration Regulation Act regarding skilled migration (school teacher occupations), and for supporting teacher, principal and initial teacher education accreditation authorities. These roles would need to be clearly differentiated and separated from the bottom-up role.

It is not possible to identify potential conflicts of interest in the structure of the private entity option, other than to note that bidders should be required to disclose potential conflicts, and strategies for addressing them, in their bids.

Beyond structural approaches to managing potential or perceived conflicts of interest, the institution assigned responsibility for the bottom-up approach will have to have processes in place to minimise the possibility of, and to identify, conflicts of interest in relation to project selection and reporting. Clear guidelines governing conflicts of interest will need to be established. Members of the Board and any advisory structure should be required to declare potential conflicts of interest.

Summary

Table 8.2 provides a summary of the Commission’s assessment of the three institutional options against the characteristics that it considers desirable for the organisation responsible for the bottom-up functions.

Table 8.2 Assessment of ACARA, AITSL and a private entity against desirable characteristics for the institution

<i>Desirable characteristics [ideal rating]</i>	<i>ACARA</i>	<i>AITSL</i>	<i>Private entity</i>
Degree of independence in day-to-day operations from the Education Council [high]	high	high	high
Degree of accountability to the Education Council [high]	high	high	medium
Degree of openness and transparency [high]	high	high	high
Scope to raise direct funding (donations) from private philanthropic and corporate sponsors [high]	low	low	high
Scope to leverage external funding for individual evaluation projects [high]	medium	medium	medium
Capacity to enter into partnerships with government organisations, schools, ECEC service providers, educators and research institutes [high]	high	high	high
Cost of establishing the institutional setup [low]	low	medium	medium
Ongoing cost of operating the institution [low]	medium	medium	medium
Scope to manage risks arising from conflicts of interest between the existing and new functions of the organisation [high]	medium	medium	not applicable

On this assessment, the private entity has a clear advantage over both ACARA and AITSL in terms of being able to attract donations from philanthropic and corporate sponsors, but it compares either equally well or less favourably against the other characteristics. In particular, given the existing policy, funding and delivery roles of the Australian, state and territory governments, an existing organisation, operating within the ambit of the EC, is to be preferred. ACARA and AITSL have an advantage over the private entity in the critical area of accountability to the Education Council. ACARA has an advantage over both AITSL and the private entity in terms of the costs relating to establishing the institution.

Overall, there is not a lot of difference between the options. However, on balance, the Commission considers the best starting point for delivery on the bottom-up approach is to embed the institution within ACARA. The institutional arrangements associated with an expansion of ACARA's functions are summarised in figure 8.1.

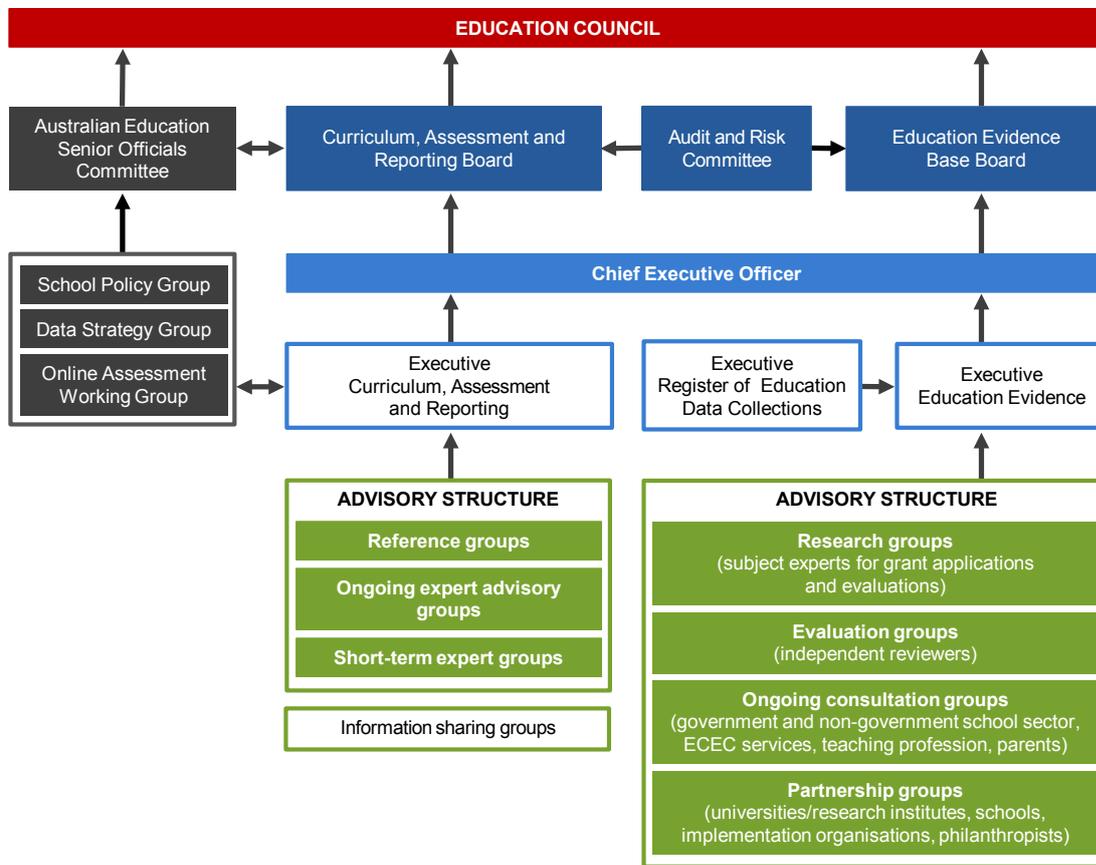
Governance arrangements for ACARA's new functions

The Commission recommends the following governance arrangements.

- An independent Board and chairperson for the new bottom-up division, with Board members appointed by the EC through a transparent selection process, and in their own right, not in a representative capacity. The CEO of ACARA will be common to both divisions and could be an ex-officio member of both boards.
 - To strengthen the independence of the Board and to improve transparency, the Board members would not include public servants from school education and ECEC departments, nor serving officers from the non-government education sectors. Consultation with stakeholders would be facilitated through the establishment of formal advisory bodies, which would also include representatives of other groups, including schools, ECEC services, educators, parents and researchers.
- A charter and letter of expectation from the EC — to set strategic directions and provide guidance about the activities that the new division of ACARA is expected to undertake.
- Veto power in the selection of research projects for the EC, which would use this power in an open and transparent way (such as through communicating any decision in writing).
- A review of the bottom-up arrangements by an independent reviewer every 5 years, commissioned by the EC.

Governments and their departments would still be free to commission or undertake their own internal research and would also be free to collaborate and form partnerships with ACARA. However, consideration should be given to the new division of ACARA taking over responsibility for AITSL's research priorities, given AITSL is also a Commonwealth agency and its priorities overlap with research that might be commissioned under the bottom-up approach.

Figure 8.1 Proposed governance structure for ACARA



Funding arrangements

It should be possible to meet the cost of implementing the bottom-up approach from within the existing education budget envelope. The Commission anticipates that the cost will be small, relative to the recurrent education budget.

Governments should commit to funding the bottom-up approach for at least ten years. This commitment would enable ACARA to work with some certainty in implementing the bottom-up approach, in developing partnerships with other institutions and in commissioning research that is long-term in nature. It would also enable time for the implementation of best practice to have an impact. ACARA’s capacity to work with certainty would be even stronger if funding was provided as an upfront endowment.

The current ACARA funding model (50 per cent from the Australian Government and 50 per cent from states and territories, with contributions proportional to the size of their populations) should be applied to cover the additional functions.

RECOMMENDATION 8.1

The Australian, state and territory governments should task the COAG Education Council to provide explicit policy direction through a *National Education Evaluation Agreement*, which would define the:

- objectives of the agreement
- nature of the research to be undertaken in the bottom-up evaluation of what works and what does not work, including research on the best implementation strategies
- evidentiary standards or frameworks to be applied, including process evaluation and assessment of cost-effectiveness
- requirements for translation and communication of evidence (including implementation strategies).

They should also request the Education Council to:

- assign the Australian Curriculum, Assessment and Reporting Authority (ACARA) to be responsible and accountable for implementation of the functions set out above and in Recommendation 7.2
- specify ACARA's expanded governance arrangements, functions and operations including:
 - responsibility for promoting a culture of using the evidence base by policy makers and educators
 - scope for co-operative partnerships between research institutes, system managers, schools, early childhood education providers and educators
 - scope for co-operative partnerships with private philanthropic organisations, both in Australia and overseas, to leverage the growing interest and support for high-quality work in this area.

The Australian Government should legislate the changes to ACARA's Act.

A Public consultation

In keeping with its standard practice, the Commission has actively encouraged public participation in this inquiry.

- Following receipt of the terms of reference on 11 March 2016, an advertisement was placed in major Australian newspapers and a circular was sent to identified interested parties.
- An issues paper was released on 11 April 2016. Prior to the release of the draft report on 6 September, 80 submissions were received. Following the release of the draft report, a further 68 submissions were received, making a total of 148 submissions overall (table A.1). These submissions are available online at <http://www.pc.gov.au/inquiries/current/education-evidence/submissions>.
- As detailed in table A.2, consultations were held with individuals and representatives from the Australian, and state and territory government departments and agencies, academics and peak bodies, in each of the sectors covered in this study.
- Public hearings were also held in Melbourne on 18 October and Sydney on 20 October 2016 (table A.3).
- A roundtable was also held in Melbourne on 14 October 2016 (table A.4).

The Commission thanks all individuals and organisations who have contributed to this inquiry.

Table A.1 Submissions^a

<i>Individual or organisation</i>	<i>Submission number</i>
Aisbett, Emma	DR99
Anvieg, Wilma	80
Association of Heads of Independent Schools of Australia (AHISA)	50, DR94
Australian Academy of Science	67
Australian Association for Research in Education (AARE)	22, DR114
Australian Association of Special Education (AASE)	30
Australian Bureau of Statistics (ABS)	78, DR105
Australian Childcare Alliance New South Wales (ACA NSW)	28
Australian Children's Education and Care Quality Authority (ACECQA)	11, DR108
Australian Council for Educational Research (ACER)	32, DR131
Australian Council of TESOL [Teaching English to Speakers of Other Languages] Associations (ACTA)	DR120
Australian Curriculum, Assessment and Reporting Authority (ACARA)	62, DR147
Australian Government Department of Education and Training (DET)	68, DR143
Australian Housing and Urban Research Institute (AHURI)	74
Australian Institute of Health and Welfare (AIHW)	55, DR128
Australian Institute for Teaching and School Leadership (AITSL)	5
Australian Learning Lecture (ALL)	DR95
Australian Library and Information Association (ALIA)	43
Australian Parents Council (APC)	DR133
Australian Primary Principals Association (APPA)	64, DR89
Australian Research Alliance for Children and Youth (ARACY)	DR116
Australian Research Council Centre of Excellence for Children and Families over the Life Course (Life Course Centre), University of Queensland	9
Australian Secondary Principals Association (ASPA)	DR119
Australian Sports Commission (ASC)	DR107
Biddle, Dr Nicholas and Breunig, Prof Robert	25
Brooks, Prof Fiona and Redmond, Assoc Prof Gerry	38
Brown, Claire	DR127
Catholic Education Diocese of Parramatta (CEDP)	23
Catholic Education Melbourne (CEM)	72
Catholic School Parents Australia (CSPA)	DR130
Centre for Independent Studies (CIS)	DR126
Centre for Research in Early Childhood Group (CREC), Edith Cowan University	53
Children and Young People with Disability Australia (CYDA)	66
City of Boroondara	20
Commissioner for Children and Young People Western Australia (CCYP WA)	40
Community Child Care Association (CCC)	58
Community Child Care Co-operative New South Wales (CCCC NSW)	51
Craig, Ashley	DR85
de Lemos, Dr Molly; Neilson, Dr Roslyn; Wheldall, Prof Kevin; and Wheldall, Dr Robyn	6
Deakin University School of Education	DR136

(Continued next page)

Table A.1 (continued)

<i>Individual or organisation</i>	<i>Submission number</i>
Early Childhood Australia (ECA)	71, DR134
Early Learning Association of Australia (ELAA)	DR111
Early Start, University of Wollongong	26
Education Endowment Foundation (EEF)	DR97
Edwards, Assoc Prof Ben and Siphthorp, Mark	73
Essential Education Economics (E3) and School Efficiency Metrics Australasia (SEMETRICA)	17, DR104
Family Day Care Australia (FDCA)	63
Federation of Ethnic Communities' Councils of Australia (FECCA)	29
Fraser Mustard Centre	52, DR112
Gaylard, Andrew	DR81
Glover, John	3
Gold Coast Dyslexia Support Group	56
Good Shepherd Australia and New Zealand (Good Shepherd)	DR118
Goodstart Early Learning	70, DR135
Grattan Institute	61
Hempenstall, Dr Kerry	1 #
Howell, Dr Sally	DR117
Independent Education Union of Australia (IEUA)	18; DR109
Independent Education Union of Australia – Queensland and Northern Territory Branch (IEUA-QNT)	21
Independent Schools Council of Australia (ISCA)	39, DR138
Isolated Children's Parents' Association of Australia	DR102 #
Jones, Laurence	DR91
Ladwig, Assoc Prof James	DR137
Lawry, Chiara and Lux-Lee, Sarah	46 #
Learning Sciences Institute Australia (LSIA), Australian Catholic University	48
MacNeill, Dr Neil	DR84
Macquarie University Special Education Centre (MUSEC)	DR100
Magar, Sam	DR87
Mallee Track Health and Community Service (MTHCS)	DR86 #
Manickam, Julia	7
Mathers, Tamsin	8
McDougall, Mark	DR132
Melbourne Graduate School of Education (MGSE), The University of Melbourne	54
Melhuish, Stephen	DR83
Meyer, Yvonne	34, DR88
Miller, Trish	12
Minderoo Foundation	27
Mitchell Institute, Victoria University	31, DR103
Monash University	DR122
Murdoch Childrens Research Institute (MCRI), The Royal Children's Hospital Melbourne	47, DR92 #

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Table A.1 (continued)

<i>Individual or organisation</i>	<i>Submission number</i>
National Catholic Education Commission (NCEC)	49, DR106
National Centre for Student Equity in Higher Education (NCSEHE), Curtin University	13
National Centre for Vocational Education Research (NCVER)	65, DR96
National Congress of Australia's First Peoples	44
New South Wales Government (NSW Government)	79, DR145
Northern Territory Government (NT Government)	77
Northside Community Service	16
O'Donnell, Carol	DR139
Office of the Australian Information Commissioner (OAIC)	69, DR140
Population Health Research Network (PHRN)	24, DR110
Principals Australia Institute (PAI)	36
Queensland Government	DR142
Queensland University of Technology (QUT) Faculty of Education	19, DR101
Research Institute for Professional Practice, Learning and Education (RIPPLE), Charles Sturt University	45
SA NT DataLink	57
Saunders, Stephen	DR82
Scanlan, Dr Laurel	DR113
School Curriculum and Standards Authority Western Australia (SCSA WA)	14
School of Education and Professional Studies, Griffith University	76
Science of Learning Research Centre (SLRC)	DR93
Snow, Pamela	4
Social Ventures Australia (SVA)	59, DR98
Spanner, Justin	DR115
Specific Learning Difficulties Association New South Wales (SPELD NSW)	37
Speech Pathology Australia	35
Stanley, Fiona	41 #
Steiner Education Australia	DR124
STEM Education Research Centre (SERC), University of Canberra	DR123
Tasmanian Government	75, DR146
Telethon Kids Institute	15, DR129
The Smith Family	60
The Song Room	DR148
The University of Western Australia (UWA) Faculty of Education	10
Tidswell, Sandra	2
United Voice	42
Universities Australia	DR121
University of Tasmania (UTas) Faculty of Education	33, DR90
Yung, Dr Jae Yup	DR125
Victorian Council of Social Service (VCOSS)	DR141
Victorian Government	DR144

^a A hash (#) indicates that the submission includes attachments.

Table A.2 Consultations

Individual or organisation

NEW SOUTH WALES

Australian Children's Education and Care Quality Authority (ACECQA)
Australian Council of State School Organisations (ACSSO)
Australian Curriculum, Assessment and Reporting Authority (ACARA)
Education Council's Data Strategy Group (DSG)
NSW Centre for Education Statistics and Evaluation (CESE)
NSW Department of Education
NSW Department of Premier and Cabinet
NSW Treasury
Office of the Australian Information Commissioner (OAIC)
Sax Institute
United Voice

VICTORIA

Australian Council for Educational Research (ACER)
Australian Institute of Family Studies (AIFS)
Australian Institute for Teaching and School Leadership (AITSL)
Autism Spectrum Australia (Aspect)
Centre for International Research on Education Systems (CIRES)
Chief Executive Officers from the Australasian Curriculum, Assessment and Certification Authorities
Early Childhood Australia (ECA)
Education Endowment Foundation (EEF)
Melbourne Graduate School of Education (MGSE), The University of Melbourne
Mitchell Institute, Victoria University
Murdoch Childrens Research Institute (MCRI)
National Catholic Education Commission (NCEC)
National Centre for Vocational Education Research (NCVER)
National Independent Special Schools Association (NISSA)
National Schools Interoperability Program (NSIP)
Social Ventures Australia (SVA)
The Song Room
VIC Department of Education and Training

QUEENSLAND

Independent Schools Queensland
QLD Department of Education and Training
QLD Department of Premier and Cabinet
QLD Treasury

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Table A.2 (continued)

Individual or organisation

SOUTH AUSTRALIA

Catholic Education South Australia
National Centre for Vocational Education Research (NCVER)
SA Department for Education and Child Development
SA Department of Premier and Cabinet
SA NT DataLink

WESTERN AUSTRALIA

Chair in Public Health, The University of Western Australia
Population Health Research Network (PHRN)
Telethon Kids Institute
WA Commissioner for Children and Young People
WA Department of Education
WA Department of Local Government and Communities (Early Childhood)

TASMANIA

Blacklow, Dr Paul, University of Tasmania
Tasmanian Catholic Education Office (TCEO)
TAS Department of Education
TAS Department of Premier and Cabinet

NORTHERN TERRITORY

Association of Independent Schools Northern Territory (AISNT)
Catholic Education Office Northern Territory
Menzies School of Health Research, Charles Darwin University
NT Department of Education
NT Department of the Chief Minister

AUSTRALIAN CAPITAL TERRITORY

Association of Heads of Independent Schools of Australia (AHISA)
Australian Bureau of Statistics (ABS)
ACT Education Directorate
Australian Government Department of Education and Training (DET)
Australian Government Department of Education and Training (Secretary's Office)
Australian Government Department of Health
Australian Institute of Health and Welfare (AIHW)
Australian Primary Principals Association (APPA)
Australian Treasury
Education Council's Data Strategy Group (DSG)
Independent Schools Council of Australia (ISCA)
Office of Minister for Education

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Table A.2 (continued)

Individual or organisation

Video/teleconference

ACT Education Directorate
Australian Children's Education and Care Quality Authority (ACECQA)
Australian Curriculum, Assessment and Reporting Authority (ACARA)
Australian Government Department of Education and Training (DET)
Children and Young People with Disability Australia (CYDA)
Federation of Parents and Friends Associations of Catholic Schools in Queensland
NSW Centre for Education Statistics and Evaluation (CESE)
Queensland Catholic Education Commission (QCEC)
SA Department for Education and Child Development
VIC Department of Education and Training
WA Department of Education

Table A.3 Public hearings

Individual or organisation

Transcript page numbers

Melbourne – Tuesday 18 October 2016

Mitchell Institute, Victoria University	3–16
Ms Yvonne Meyer	17–24
Australian Association for Research in Education (AARE)	25–33
Australian Parents Council (APC)	34–42
Australian Research Alliance for Children and Youth (ARACY)	43–54
Deakin University School of Education	55–67

Sydney – Thursday 20 October 2016

Dr Sally Howell	70–78
Australian Council of TESOL Associations (ACTA)	79–88
The Smith Family	89–99

Table A.4 Roundtable

Individual or organisation

Melbourne – Friday 14 October 2016

Australian Government Department of Education and Training (DET)
Australian Bureau of Statistics (ABS)
ACT Education Directorate
Australian Children’s Education and Care Quality Authority (ACECQA)
Australian Council for Educational Research (ACER)
Australian Institute for Teaching and School Leadership (AITSL)
E4Kids study
Grattan Institute
Melbourne Graduate School of Education (MGSE), The University of Melbourne
Mitchell Institute, Victoria University
National Catholic Education Commission (NCEC)
NSW Department of Education
Principals Australia Institute (PAI)
QLD Department of Education and Training
Social Ventures Australia (SVA)
SA Department for Education and Child Development
TAS Department of Education
VIC Department of Education and Training

B Data quality issues, and data and evidence gaps: stakeholder summary

This appendix compiles the education data quality issues (table B.1), data gaps (table B.2), evidence gaps (table B.3) and evidence creation and use gaps (table B.4) as put to the Commission during its consultation process.

Data quality issues in table B.1 are categorised using the characteristics that education data ideally have as outlined in chapter 2, box 2.3. These include:

- relevance — the extent to which the data meet user needs in terms of the concept(s) measured and population(s) represented. This includes the scope and coverage of the data, classifications and statistical standards used and whether the dataset incorporates all relevant items of interest
- timeliness — the length of time between the period to which the data pertain and when the data are released, and the frequency of data collection
- accuracy — the extent to which the data correctly describe what they were designed to measure
- coherence — the internal consistency of the data, as well as its comparability with other sources of information. Coherence is promoted by the use of standard concepts, classifications, populations and methods of collection.

Table B.1 Education data quality issues^a

<i>Topic</i>	<i>Quality issue^b</i>	<i>Submission</i>		
Early childhood education and care data				
Specific collections				
<i>National Early Childhood Education and Care Collection</i>	Relevance	ISCA (sub. 39)		
	Accuracy	AIHW (sub. 55, sub. DR128)		
	Coherence	DET (sub. 68) CCCC NSW (sub. 51) ECA (sub. 71)	Mitchell Institute (sub. 31, sub. DR103) ISCA (sub. 39)	
<i>Australian Early Development Census</i>	Timeliness	DET (sub. 68) Life Course Centre (sub. 9)	City of Boroondara (sub. 20)	
Child data				
<i>Outcomes</i>	Coherence	DET (sub. 68) MGSE (sub. 54)	Speech Pathology of Australia (sub. 35)	
<i>Attendance and enrolment</i>	Relevance	ECA (sub. 71) Goodstart Early Learning (sub. 70)	Mitchell Institute (sub. 31) United Voice (sub. 42)	
	Timeliness	Mitchell Institute (sub. 31)		
	Coherence	AIHW (sub. 55) ECA (sub. 71)	Mitchell Institute (sub. 31)	
Non-specific (general statements about data quality in the sector)	Relevance	DET (sub. 68) ECA (sub. DR134) MGSE (sub. 54)	Minderoo Foundation (sub. 27) Mitchell Institute (sub. 31) QUT Faculty of Education (sub. 19)	
		Timeliness	DET (sub. 68) City of Boroondara (sub. 20) ECA (sub. 71) Early Start, University of Wollongong (sub. 26) FDCA (sub. 63)	Minderoo Foundation (sub. 27) Mitchell Institute (sub. 31) QUT Faculty of Education (sub. 19) Telethon Kids Institute (sub. 15)
			Accuracy	SCSA WA (sub. 14)
	Coherence		ABS (sub. 78) ACA NSW (sub. 28) DET (sub. 68) AIHW (sub. 55) ALIA (sub. 43) Life Course Centre (sub. 9) CREC (sub. 53) ECA (sub. 71, sub. DR134) FDCA (sub. 63) Goodstart Early Learning (sub. DR135) Mitchell Institute (sub. 31)	NSW Government (sub. 79, sub. DR145) QUT Faculty of Education (sub. 19) RIPPLE (sub. 45) SCSA WA (sub. 14) Tasmanian Government (sub. 75) Telethon Kids Institute (sub. 15) United Voice (sub. 42) Victorian Government (sub. DR144)

(Continued next page)

Table B.1 (continued)

<i>Topic</i>	<i>Quality issue^b</i>	<i>Submission</i>	
School education data			
Specific collections			
<i>National School Statistics Collection</i>	Relevance	AIHW (sub. 55)	
	Coherence	ISCA (sub. DR138)	
<i>Nationally Consistent Collection of Data on School Students with Disability</i>	Relevance	CYDA (sub. 66)	Speech Pathology Australia (sub. 35)
	Accuracy	CEM (sub. 72) CYDA (sub. 66)	ISCA (sub. DR138)
	Coherence	DET (sub. 68) CEM (sub. 72) CYDA (sub. 66)	ISCA (sub. DR138) NCEC (sub. 49)
Student data			
<i>Student outcomes and behaviour</i>	Relevance	Australian Academy of Science (sub. 67)	
	Coherence	Australian Academy of Science (sub. 67) DET (sub. 68)	QUT Faculty of Education (sub. 19) UWA Faculty of Education (sub. 10)
<i>Attendance and enrolment</i>	Relevance	ACARA (sub. 62) CCYP WA (sub. 40) DET (sub. 68)	Life Course Centre (sub. 9) MCRI (sub. DR92)
	Coherence	DET (sub. 68) AIHW (sub. 55)	The Smith Family (sub. 60)
<i>Disability</i>	Relevance	SCSA WA (sub. 14)	Speech Pathology Australia (sub. 35)
	Coherence	CYDA (sub. 66) NCEC (sub. 49)	Speech Pathology Australia (sub. 35)
<i>Marginalised groups^c</i>	Relevance	ACTA (sub. DR120) DET (sub. 68)	The Smith Family (sub. 60)
	Accuracy	NT Government (sub. 77)	Tasmanian Government (sub. 75)
Non-specific (general statements about data quality in the sector)	Relevance	Howell (sub. DR117) NCEC (sub. 49)	SVA (sub. DR98)
	Timeliness	IEUA-QNT (sub. 21)	NCEC (sub. 49)
	Coherence	AHISA (sub. 50) ABS (sub. 78) DET (sub. 68) APPA (sub. 64) CREC (sub. 53)	ISCA (sub. DR138) NCEC (sub. 49) NSW Government (sub. 79) NT Government (sub. 77) The Song Room (sub. DR148)

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Table B.1 (continued)

<i>Topic</i>	<i>Quality issue^b</i>	<i>Submission</i>	
Workforce data			
Specific collections			
<i>National ECEC Workforce Census</i>	Relevance	ECA (sub. 71, sub. DR134)	
Non-specific			
<i>ECEC workforce data</i>	Relevance	ECA (sub. 71) Mitchell Institute (sub. 31)	QUT Faculty of Education (sub. 19)
	Timeliness	DET (sub. 68)	QUT Faculty of Education (sub. 19)
	Accuracy	QUT Faculty of Education (sub. 19)	
<i>Teacher data</i>	Relevance	DET (sub. 68)	QUT Faculty of Education (sub. 19)
		AITSL (sub. 4)	Speech Pathology Australia (sub. 35)
		Mitchell Institute (sub. 31) Grattan Institute (sub. 61)	
	Timeliness	Mitchell Institute (sub. 31)	
Coherence	DET (sub. 68)	Monash University (sub. DR122)	
	AITSL (sub. 4)	NCEC (sub. 49)	
	Mitchell Institute (sub. 31)		
Data on external influences			
Parent-reported data	Relevance	Grattan Institute (sub. 61) ISCA (sub. 39)	Mitchell Institute (sub. 31)
	Accuracy	AHISA (sub. 50)	NCEC (sub. 49)
		Grattan Institute (sub. 61)	ISCA (sub. 39)
	Coherence	Life Course Centre (sub. 9) Mitchell Institute (sub. 31)	UWA Faculty of Education (sub. 10)
Longitudinal data			
Longitudinal studies^d	Relevance	AARE (sub. DR114) ACECQA (sub. 11, sub. DR108) Life Course Centre (sub. 9) CREC (sub. 53) CCC (sub. 58) CIS (sub. DR126) ECA (sub. 71) Edwards and Siphthorp (sub. 73) FDCA (sub. 63) Goodstart Early Learning (sub. 70, sub. DR135) ISCA (sub. DR138)	Mitchell Institute (sub. 31, sub. DR103) NCEC (sub. DR106) NCVER (sub. 65) Queensland Government (sub. DR142) QUT Faculty of Education (sub. 19, sub. DR101) RIPPLE (sub. 45) Telethon Kids Institute (sub. DR129) United Voice (sub. 42) VCOSS (sub. DR141)

^a Data access, reporting and linkage issues are not considered in this table. ^b Relevance refers to issues of comprehensiveness and granularity, timeliness to issues of frequency of collection and data release, and coherence to issues of consistency and comparability. ^c Marginalised groups include students experiencing disadvantage, students living in regional and remote areas, Indigenous students, students with refugee backgrounds and students with English as an additional language or dialect. ^d Includes the *Longitudinal Study of Australian Children*, *Longitudinal Study of Indigenous Children* and the *Longitudinal Survey of Australian Youth*.

Table B.2 Education data gaps^a

<i>Topic</i>	<i>Submission</i>	
Early learning^b		
Early learning outcomes		
<i>Cognitive</i>	AIHW (sub. 55, sub. DR128) City of Boroondara (sub. 20) Early Start, University of Wollongong (sub. 26)	MGSE (sub. 54) Speech Pathology Australia (sub. 35)
<i>Non-cognitive</i>	AIHW (sub. 55, sub. DR128) Early Start, University of Wollongong (sub. 26) Goodstart Early Learning (sub. 70) MGSE (sub. 54)	Minderoo Foundation (sub. 27) Northside Community Service (sub. 16) QUT Faculty of Education (sub. 19) Speech Pathology Australia (sub. 35)
Students with disability	CYDA (sub. 66) SPELD NSW (sub. 37)	Speech Pathology Australia (sub. 35)
Marginalised groups^c	Early Start, University of Wollongong (sub. 26) FECCA (sub. 29)	Goodstart Early Learning (sub. 70) Northside Community Service (sub. 16)
Other	AIHW (sub. 55) Life Course Centre (sub. 9) ECA (sub. 71)	QUT Faculty of Education (sub. 19) UWA Faculty of Education (sub. 10)
School education		
Student outcomes		
<i>Early assessment</i>	AASE (sub. 30) ACER (sub. 32) ACARA (sub. 62) CIS (sub. DR126) de Lemos et al. (sub. 6)	Hempenstall (sub. 1) Howell (sub. DR117) Meyer (sub. 34, sub. DR88) Speech Pathology Australia (sub. 35)
<i>Non-cognitive capabilities, 21st century skills, wellbeing and engagement</i>	ACA NSW (sub. 28) ACECQA (sub. 11) ACER (sub. 32) ACARA (sub. 62, sub. DR147) DET (sub. 68) AIHW (sub. 55) ARACY (sub. DR116) Life Course Centre (sub. 9) ASC (sub. DR107) ASPA (sub. DR119) Brooks and Redmond (sub. 38) CEDP (sub. 23) CEM (sub. 72) CREC (sub. 53) CCYP WA (sub. 40) CCC (sub. 58) City of Boroondara (sub. 20) ECA (sub. 71) Edwards and Siphthorp (sub. 73)	Fraser Mustard Centre (sub. DR112) Good Shepherd (sub. DR118) Goodstart Early Learning (sub. 70) Grattan Institute (sub. 61) LSIA (sub. 48) MGSE (sub. 54) Minderoo Foundation (sub. 27) Mitchell Institute (sub. 31, sub. DR103) MCRI (sub. 47, sub. DR92) NCEC (sub. 49, sub. DR106) National Congress of Australia's First Peoples (sub. 44) NSW Government (sub. 79) PAI (sub. 36) QUT Faculty of Education (sub. 19) RIPPLE (sub. 45) School of Education and Professional Studies, Griffith University (sub. 76)

(Continued next page)

Table B.2 (continued)

<i>Topic</i>	<i>Submission</i>	
<i>Non cognitive capabilities, 21st century skills, wellbeing and engagement (cont.)</i>	SLRC (sub. DR93) SVA (sub. 59) Speech Pathology Australia (sub. 35) Telethon Kids Institute (sub. 15)	UWA Faculty of Education (sub. 10) UTas Faculty of Education (sub. 33, sub. DR90) VCOSS (sub. DR141)
Students with disability	AASE (sub. 30) CYDA (sub. 66) Howell (sub. DR117) LSIA (sub. 48)	MUSEC (sub. DR100) SPELD NSW (sub. 37) Speech Pathology Australia (sub. 35)
Marginalised groups^c	ACTA (sub. DR120) CREC (sub. 53) Goodstart Early Learning (sub. 70) Grattan Institute (sub. 61) Minderoo Foundation (sub. 27)	National Congress of Australia's First Peoples (sub. 44) NT Government (sub. 77) The Smith Family (sub. 60) VCOSS (sub. DR141)
Education practices	Australian Academy of Science (sub. 67) Fraser Mustard Centre (sub. DR112) Grattan Institute (sub. 61)	QUT Faculty of Education (sub. 19) Speech Pathology Australia (sub. 35) SVA (sub. 59)
Other	ALIA (sub. 43) Life Course Centre (sub. 9) Good Shepherd (sub. DR118) Grattan Institute (sub. 61)	PAI (sub. 36) Spanner (sub. DR115) Steiner Education Australia (sub. DR124) VCOSS (sub. DR141)
Education workforce		
Initial teacher education	AITSL (sub. 5) Mitchell Institute (sub. 31)	Monash University (sub. DR122)
Staff capabilities or qualifications	AASE (sub. 30) PAI (sub. 36)	SVA (sub. 59) United Voice (sub. 42)
Other	AITSL (sub. 5) ALIA (sub. 43) Life Course Centre (sub. 9) PAI (sub. 36)	QUT Faculty of Education (sub. 19, sub. DR101) Speech Pathology Australia (sub. 35) United Voice (sub. 42)
External influences		
Home learning environment	Edwards and Siphthorp (sub. 73) Telethon Kids Institute (sub. 15)	VCOSS (sub. DR141)
Parental engagement and attitudes	APC (sub. DR133) Life Course Centre (sub. 9) CCYP WA (sub. 40) CSPA (sub. DR130)	NCVER (sub. 65) QUT Faculty of Education (sub. 19) VCOSS (sub. DR141)
Other	Brooks and Redmond (sub. 38) FECCA (sub. 29)	SLRC (sub. DR93) VCOSS (sub. DR141)

^a Data access, reporting and linkage issues are not considered in this table. ^b Includes children not in early childhood education and care. ^c Marginalised groups include students experiencing disadvantage, students living in regional and remote areas, Indigenous students, students with refugee backgrounds and students with English as an additional language or dialect.

Table B.3 Gaps in education evidence^a

<i>Topic</i>	<i>Submission</i>
Specific evidence about early childhood education and care	
Policies, programs and practices	ACECQA (sub. 11, sub. DR108) ELAA (sub. DR111) AIHW (sub. 55) Early Start, University of Wollongong (sub. 26) APPA (sub. DR89) Goodstart Early Learning (sub. 70) CCC (sub. 58) MGSE (sub. 54) CCCC NSW (sub. 51) NSW Government (sub. 79)
Quality	ACECQA (sub. 11, sub. DR108) Edwards and Siphthorp (sub. 73) AIHW (sub. 55, sub. DR128) Goodstart Early Learning (sub. 70) Biddle and Breunig (sub. 25) Mitchell Institute (sub. 31, sub. DR103) CCC (sub. 58) RIPPLE (sub. 45) CCCC NSW (sub. 51) Telethon Kids Institute (sub. 15) ECA (sub. 71) UWA Faculty of Education (sub. 10) ELAA (sub. DR111) United Voice (sub. 42)
Attendance	ACECQA (sub. 11, sub. DR108) ELAA (sub. DR111) AIHW (sub. 55) Goodstart Early Learning (sub. 70) Biddle and Breunig (sub. 25) Mitchell Institute (sub. 31, sub. DR103) CCC (sub. 58) RIPPLE (sub. 45) ECA (sub. 71) United Voice (sub. 42)
Other	AARE (sub. DR114) Early Start, University of Wollongong (sub. 26) DET (sub. 68) Goodstart Early Learning (sub. 70) AIHW (sub. 55) NCSEHE (sub. 13) Biddle and Breunig (sub. 25) NSW Government (sub. 79) CCC (sub. 58) QUT Faculty of Education (sub. 19) Deakin University School of Education (sub. DR136) UWA Faculty of Education (sub. 10) ECA (sub. 71) United Voice (sub. 42)
Specific evidence about school education	
Multiple topics	Biddle and Breunig (sub. 25) Mitchell Institute (sub. 31)
Non-sector specific evidence	
Policies, programs and practices	Australian Academy of Science (sub. 67) Grattan Institute (sub. 61) ALIA (sub. 43) Hempenstall (sub. 1) ALL (sub. DR95) ISCA (sub. DR138) ARACY (sub. DR116) Jung (sub. DR125) ASPA (sub. DR119) MUSEC (sub. DR100) Brown (sub. DR127) Mitchell Institute (sub. 31, sub. DR103) CYDA (sub. 66) MCRI (sub. 47, sub. DR92) CCYP WA (sub. 40) National Congress of Australia's First Peoples (sub. 44) CSPA (sub. DR130) NT Government (sub. 77) de Lemos et al. (sub. 6) QUT Faculty of Education (sub. 19, sub. DR101) Deakin University School of Education (sub. DR136) SVA (sub. 59, sub. DR98) ECA (sub. 71) Speech Pathology Australia (sub. 35) EEF (sub. DR97) The Smith Family (sub. 60) FDCA (sub. 63) Universities Australia (sub. DR121) Fraser Mustard Centre (sub. 52, sub. DR112) VCOSS (sub. DR141)

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Table B.3 (continued)

<i>Topic</i>	<i>Submission</i>	
Students with disability	CYDA (sub. 66)	Mitchell Institute (sub. 31)
Marginalised groups^b	ACECQA (sub. 11, sub. DR108) AIHW (sub. 55) ARACY (sub. DR116) Biddle and Breunig (sub. 25) ELAA (sub. DR111) Early Start, University of Wollongong (sub. 26) Good Shepherd (sub. DR118) Goodstart Early Learning (sub. 70)	Mitchell Institute (sub. 31) NCEC (sub. DR106) NCSEHE (sub. 13) National Congress of Australia's First Peoples (sub. 44) The Smith Family (sub. 60) UWA Faculty of Education (sub. 10) VCOSS (sub. DR141)
Wellbeing and non-cognitive research	Life Course Centre (sub. 9) Biddle and Breunig (sub. 25) CCYP WA (sub. 40) CCC (sub. 58) MGSE (sub. 54) Mitchell Institute (sub. 31)	PAI (sub. 36) QUT Faculty of Education (sub. 19) SVA (sub. 59) Telethon Kids Institute (sub. 15) United Voice (sub. 42) VCOSS (sub. DR141)
External influences	ACECQA (sub. 11) ACER (sub. 32) ACTA (sub. DR120) AHURI (sub. 74) AIHW (sub. 55) ARACY (sub. DR116) CREC (sub. 53) CCC (sub. 58) Good Shepherd (sub. DR118)	LSIA (sub. 48) Mitchell Institute (sub. 31) MCRI (sub. 47) NCEC (sub. 49) NCVER (sub. 65) National Congress of Australia's First Peoples (sub. 44) SLRC (sub. DR93)
Longitudinal outcomes		
<i>Value-added</i>	ASPA (sub. DR119) CCYP WA (sub. 40) Fraser Mustard Centre (sub. DR112) Grattan Institute (sub. 61) ISCA (sub. DR138) Meyer (sub. DR88)	MCRI (sub. DR92) Queensland Government (sub. DR142) Telethon Kids Institute (sub. DR129) UTas Faculty of Education (sub. DR90) VCOSS (sub. DR141)
<i>General</i>	ACECQA (sub. 11, sub. DR108) ALL (sub. DR95) Biddle and Breunig (sub. 25) CCC (sub. 58) CCYP WA (sub. 40) CCCC NSW (sub. 51) Deakin University School of Education (sub. DR136) Grattan Institute (sub. 61) ISCA (sub. DR138) Mitchell Institute (sub. 31, sub. DR103)	MCRI (sub. 47, sub. DR92) NCEC (sub. 49, sub. DR106) NCSEHE (sub. 13) NCVER (sub. 65) NSW Government (sub. 79) PAI (sub. 36) QUT Faculty of Education (sub. 19) SLRC (sub. DR93) SVA (sub. 59) United Voice (sub. 42) VCOSS (sub. DR141)

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Table B.3 (continued)

<i>Topic</i>	<i>Submission</i>	
Education workforce research	DET (sub. 68)	Mitchell Institute (sub. 31)
	AITSL (sub. 5)	Monash University (sub. DR122)
	Life Course Centre (sub. 9)	PAI (sub. 36)
	Biddle and Breunig (sub. 25)	RIPPLE (sub. 45)
	LSIA (sub. 48)	United Voice (sub. 42)
Other	DET (sub. 68)	Jung (sub. DR125)
	ARACY (sub. DR116)	Mitchell Institute (sub. 31)
	Life Course Centre (sub. 9)	SVA (sub. 59)
	Biddle and Breunig (sub. 25)	Spanner (sub. DR115)
	Brooks and Redmond (sub. 38)	SPELD NSW (sub. 37)
	CCYP WA (sub. 40)	Telethon Kids Institute (sub. 15)
	Edwards and Siphthorp (sub. 73)	

a Many topics in this table relate to the broader issue of what works best to improve education outcomes.

b Marginalised groups include students experiencing disadvantage, students living in regional and remote areas, Indigenous students, students with refugee backgrounds and students with English as an additional language or dialect.

Table B.4 Gaps in evidence creation and use^a

<i>Topic</i>	<i>Submission</i>
Researcher ^b skills	<p>CIS (sub. DR126) DET (sub. 68) CREC (sub. 53) ECA (sub. 71) Fraser Mustard Centre (sub. 52) Grattan Institute (sub. 61) IEUA (sub. 18) ISCA (sub. DR138) Ladwig (sub. DR137) Lawry and Lux-Lee (sub. 48) Monash University (sub. DR122)</p> <p>MGSE (sub. 54) Mitchell Institute (sub. 31) NCVER (sub. 65) National Congress of Australia's First Peoples (sub. 44) QUT Faculty of Education (sub. 19) RIPPLE (sub. 45) SLRC (sub. DR93) Telethon Kids Institute (sub. 15) Universities Australia (sub. DR121)</p>
Researcher ^b funding and resources	<p>ACARA (sub. 62) DET (sub. 68) CREC (sub. 53) ECA (sub. 71) Early Start, University of Wollongong (sub. 26) Grattan Institute (sub. 61) ISCA (sub. DR138) Ladwig (sub. DR137) MUSEC (sub. DR100) Mitchell Institute (sub. 31)</p> <p>MCRI (sub. 47, sub. DR92) Monash University (sub. DR122) NCVER (sub. 65) National Congress of Australia's First Peoples (sub. 44) QUT Faculty of Education (sub. 19) SLRC (sub. DR93) SVA (sub. DR98) Universities Australia (sub. DR121) VCOSS (sub. DR141)</p>
Initial teacher education and professional development	<p>APPA (sub. DR89) Deakin University School of Education (sub. DR136) Early Start, University of Wollongong (sub. 26) Hempenstall (sub. 1) ISCA (sub. DR138) Magar (sub. DR87) MUSEC (sub. DR100)</p> <p>Manickam (sub. 7) Minderoo Foundation (sub. 27) Snow (sub. 4) SPELD NSW (sub. 37) Telethon Kids Institute (sub. 15) Tidswell (sub. 2) UTas Faculty of Education (sub. DR90) VCOSS (sub. DR141)</p>
Educators' creation of evidence ^c	<p>AHISA (sub. 50) AITSL (sub. 5) ASPA (sub. DR119) Deakin University School of Education (sub. DR136) Early Start, University of Wollongong (sub. 26) Hempenstall (sub. 1) Gold Coast Dyslexia Support Group (sub. 56) IEUA (sub. 18)</p> <p>IEUA-QNT (sub. 21) ISCA (sub. DR138) Meyer (sub. 34) Minderoo Foundation (sub. 27) Mitchell Institute (sub. 31) Telethon Kids Institute (sub. 15) UTas Faculty of Education (sub. DR90)</p>

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Table B.4 (continued)

<i>Topic</i>	<i>Submission</i>
Translation and communication of evidence	<p>ACER (sub. 32)</p> <p>AHISA (sub. DR94)</p> <p>APPA (sub. DR89)</p> <p>CEM (sub. 72)</p> <p>Deakin University School of Education (sub. DR136)</p> <p>ECA (sub. 71)</p> <p>Grattan Institute (sub. 61)</p> <p>Goodstart Early Learning (sub. DR135)</p> <p>ISCA (sub. DR138)</p> <p>LSIA (sub. 48)</p> <p>MUSEC (sub. DR100)</p> <p>MCRI (sub. DR92)</p> <p>Mitchell Institute (sub. 31, sub. DR103)</p> <p>QUT Faculty of Education (sub. DR101)</p> <p>SLRC (sub. DR93)</p> <p>SERC (sub. DR123)</p> <p>SVA (sub. 59, sub. DR98)</p> <p>Telethon Kids Institute (sub. DR129)</p> <p>Universities Australia (sub. DR121)</p> <p>VCOSS (sub. DR141)</p>
Educators' use of evidence ^d	<p>AHISA (sub. DR94)</p> <p>APC (sub. DR133)</p> <p>APPA (sub. DR89)</p> <p>ARACY (sub. DR116)</p> <p>ASPA (sub. DR119)</p> <p>CEM (sub. 72)</p> <p>CSPA (sub. DR130)</p> <p>Deakin University School of Education (sub. DR136)</p> <p>Early Start, University of Wollongong (sub. 26)</p> <p>Goodstart Early Learning (sub. DR135)</p> <p>Howell (sub. DR117)</p> <p>MUSEC (sub. DR100)</p> <p>Mathers (sub. 8)</p> <p>Meyer (sub. DR88)</p> <p>QUT Faculty of Education (sub. DR101)</p> <p>SLRC (sub. DR93)</p> <p>SVA (sub. 59, sub. DR98)</p> <p>SPELD NSW (sub. 37)</p> <p>Speech Pathology Australia (sub. 35)</p> <p>UTas Faculty of Education (sub. DR90)</p>
Governments' use of evidence ^d	<p>APC (sub. DR133)</p> <p>ARACY (sub. DR116)</p> <p>Brown (sub. DR127)</p> <p>Fraser Mustard Centre (sub. 52)</p> <p>Goodstart Early Learning (sub. DR135)</p> <p>Howell (sub. DR117)</p> <p>IEUA (sub. 18)</p> <p>MUSEC (sub. DR100)</p> <p>Mathers (sub. 8)</p> <p>Meyer (sub. 34)</p> <p>QUT Faculty of Education (sub. DR101)</p> <p>SLRC (sub. DR93)</p> <p>SPELD NSW (sub. 37)</p> <p>Steiner Education Australia (sub. DR124)</p> <p>United Voice (sub. 42)</p>

^a Gaps in the creation of evidence due to data access, reporting and linkage issues are not considered.

^b Researchers include individuals in academia and government departments. ^c Includes gaps in teachers' capacity and capability to use and collect data to create evidence, and then use this evidence to inform practice. ^d Includes gaps in the use of evidence that has been generated by researchers, such as evidence on practices and programs that work best.

C Australia's education data and evidence base

This appendix takes stock of the main collections of education data (section C.1) and of data on the external factors that influence education outcomes (section C.2). It also describes the main sources of education information (section C.3) and education evidence (section C.4). It then concludes with some comments about evidence hierarchies and randomised controlled trials (section C.5).

C.1 The main collections of education data

Education data are primarily collected by education providers (early childhood education and care (ECEC) services and schools). Some of these data, for example, informal test results, are held only at a provider level (box C.1). Other data are sent to state and territory³⁵ or national level authorities where they are aggregated into the collections that are the focus of this section. The collections are discussed at the highest level at which they are held — state or national. A few major initiatives to link data from early childhood are also briefly discussed.

Box C.1 Examples of provider-level data

Early childhood education and care (ECEC) providers

The *Education and Care Services National Law* (National Law) and *Education and Care Services National Regulations* (National Regulations) require approved ECEC providers to collect and hold a range of data that are not held by state or national authorities.

For example, enrolment data can be very comprehensive. The National Regulations outline the information that an approved ECEC provider (including family day care) must request on an enrolment form. This information includes data that are passed on to authorities such as the:

- full name, date of birth, gender and address of the child
- language spoken at home and cultural background of the child and parents.

(Continued next page)

³⁵ Referred to as state from here on unless otherwise indicated.

Box C.1 (continued)

However, it also includes data that may not be held by authorities such as a child's healthcare needs (medical conditions, allergies), medical management plan and dietary requirements (ACECQA 2013a). ECEC providers may also request other (provider-specific) information, for example, about a child's routine and home environment.

The National Regulations also stipulate that approved providers must keep:

- accurate attendance records that include each child's arrival and departure times
- documentation that includes an analysis of learning for each child
- assessments of each child's:
 - development needs
 - interests and experiences
 - participation in the provider's educational program
 - progress against the learning outcomes of the educational program (ACECQA 2013a).

ECEC providers are not required to pass these data on to state or national authorities.

Schools

The amount of data held only at a school level varies by school sector and by the capabilities of schools' online data information systems. Unlike Independent schools, government and Catholic schools operate in networks, and are, therefore, more likely to provide data to others (for example, education bodies) (ISCA, sub. 39). Online data information systems vary in the degree to which they integrate with a central data depository and in the range of data types that they can capture. The higher the level of capability, the less likely it is that a school is the only holder of the data that it collects.

Some types of data that are much more likely to be held only at a school level include results from classroom-based student assessments (set by the school) and school-based surveys. For example, teachers assess students using classroom-based standardised assessments such as the *Progressive Achievement Tests* and *Tests of Reading Comprehension* — both produced by the Australian Council for Educational Research — to gauge student learning and inform teaching practices. Some schools also assess student wellbeing through school-based surveys such as the *Social–Emotional Wellbeing Survey* — also produced by the Australian Council for Educational Research.

Early childhood education and care data collections

State collections

State ECEC collections tend to be focused on preschools because they are a state responsibility, in contrast with childcare, which is overseen by the Australian Government. The main state-level ECEC collections are summarised in table C.1. All jurisdictions administer a preschool census covering the characteristics of preschoolers, their teachers and the services they attend. Some jurisdictions run additional collections, for example, about child health and development.

Table C.1 Selected state ECEC collections

<i>Collection</i>	<i>Type of data collected</i>	<i>State</i>
Preschool Census ^a	<ul style="list-style-type: none"> • Child level — personal characteristics, program hours, program fees, whether program is delivered by a qualified teacher and if the child is repeating • Staff level — personal characteristics, role, type of activity engaged in, highest level of qualification • Service provider level — activity type, delivery setting, government funding type, management type, service operation information 	All states
School Entry Health Assessment	<ul style="list-style-type: none"> • Physical development • Parents' Evaluation of Development Status 	WA
Kindergarten Development Check ^b	21 critical markers in the areas of: <ul style="list-style-type: none"> • cognitive development • fine and gross motor skills • listening, speaking and understanding • personal and social behaviour 	Tas

^a Occurs in August of every year in all jurisdictions — collection name varies across jurisdictions. Contributes to the *National Early Childhood Education and Care Collection*. Participation for state government-managed and government-funded preschool providers is compulsory. In most jurisdictions, long day care providers offering a preschool program are not invited to complete the census; however, if eligible for the *Child Care Benefit* scheme, they are required to provide similar information to the Australian Government through the *Child Care Management System*. ^b Administered in all public and Catholic school-run kindergartens (preschools).

Sources: ABS (2016c); TASDoE (2016a); WADoH (2015).

National early childhood education and care collections

Table C.2 outlines the main ECEC data collections held at the national level, which cover information about children, staff and service providers (across both preschools and childcare), including service quality and child development. The division of responsibility for ECEC between the state and national governments (and the number of agencies involved) makes ECEC collections relatively complicated. In addition, the names of some collections are a poor reflection of their contents. These issues are clarified in a brief description of each collection following table C.2.

Table C.2 Main national ECEC collections

<i>Collection</i>	<i>Type of data collected</i>
National ECEC Collection (NECECC)	<ul style="list-style-type: none"> • Child level — personal characteristics (name, age, Indigenous status), program hours (enrolled, attended, available), program fees, whether program is delivered by a qualified teacher and if the child is repeating • Staff level — personal characteristics (name, age, Indigenous status), role, type of activity engaged in, highest level of qualification (relevant and ECEC-specific) • Service provider level — activity type, delivery setting, government funding type, management type, service operation information (weeks open)
Child Care Management System (CCMS)	<ul style="list-style-type: none"> • Child level — personal characteristics (name, age, gender, Indigenous status), disability/special needs, enrolment information, attendance/absences (daily), fees • Staff level — personal characteristics (name, age), role, position, qualifications • Service provider level — age group, weeks/hours open, places offered, programs offered and details, number of staff, fee information (daily cost and inclusions)
National ECEC Workforce Census	<ul style="list-style-type: none"> • Staff level — background, workforce size, qualifications (teaching and other ECEC-related fields), hours of work, years of experience, professional development, job tenure • Service level — hours of operation, children attending childcare (age, special needs) • Preschool characteristics — availability, curriculum or framework program is based on, qualifications and hours worked of staff delivering program
Australian Early Development Census (AEDC) ^a	<p>Approximately 100 questions across five areas of child development:</p> <ul style="list-style-type: none"> • physical health and wellbeing • social competence • emotional maturity • language and cognitive skills (school-based) • communication skills and general knowledge
National Quality Agenda IT System (NQA ITS)	<p>Service level quality data pertaining to:</p> <ul style="list-style-type: none"> • educational program and practice • children's health and safety • physical environment • staffing arrangements • relationships with children • collaborative partnerships with families and communities • leadership and service management <p>Data on serious incidents, complaints, waivers and other compliance and service contextual information</p>
Childhood Education and Care Survey	<ul style="list-style-type: none"> • Socioeconomic information • Usual care arrangements (types of care (including informal), duration and cost) • Care arrangements used in the survey reference week (types of care (including informal), duration, cost) • Attendance at preschool or preschool program (usual or in the survey week) • Need for additional care or preschool • Early childhood education and learning activities

^a Previously known as the *Australian Early Development Index*.

Sources: ABS (2015a, 2016c); ACECQA (sub. 11); Australian Government (2014); DAE (2015); DSS (2014); SRC (2014).

Administrative census data on preschools and childcare

The *National Early Childhood Education and Care Collection* (NECECC) is a census of Australian children enrolled in preschool. It was established — under the *National Information Agreement on Early Childhood Education and Care* — to provide comparable statistics on preschools across the jurisdictions. The NECECC is underpinned by data standards specified within the *National Early Childhood Education and Care National Minimum Dataset*, which is maintained in the Australian Institute of Health and Welfare’s *Metadata Online Registry*, METeOR (AIHW, sub. DR128). It aims to compile child, staff and service provider statistics from all in-scope service providers delivering a preschool program.

The scope of the collection covers all service providers delivering a preschool program to children aged 3 to 6 years who were enrolled during a reference period (ABS 2016c). The ABS compiles data for the NECECC using administrative data provided by the individual states (stand-alone preschools) and Australian Government Department of Education and Training (DET) (preschools delivered within long day care) (ABS 2016c).

For childcare services only, data are collected through the Australian Government’s *Child Care Management System* — a national system for the administration and payment of the *Child Care Benefit* and *Child Care Rebate* on behalf of parents to all approved childcare services (family day care, long day care, outside school hours care, occasional care and in home care) (DET 2014a). The system captures a large amount of data on service providers, staff and all children (aged 0 to 12 years) who are enrolled in childcare. These data reflect supply and usage of childcare across Australia (DSS 2014).

Early childhood education and care workforce data

Aside from ECEC workforce data collected in the NECECC and *Child Care Management System*, workforce data are collected through the triennial *National Early Childhood Education and Care Workforce Census* that started in 2010. The census is administered by the Social Research Centre on behalf of the DET. The census aims to address gaps in existing administrative collections in relation to both workforce data and other elements of ECEC. These gaps include the extent of participation in and provision of preschool programs, and children with additional needs in childcare. The census also aims to improve the quality of information used in developing and measuring early childhood policy and programs (SRC 2014).

Child development data

Triennially since 2009, child development data are collected nationally through the *Australian Early Development Census* (AEDC) — a nationwide census of early childhood development that takes place in a child’s first year of full-time school (DET 2015b). The Australian and state governments work in partnership with various organisations to deliver

the census while the collection and management of the data is undertaken by the Social Research Centre in Melbourne. The purpose of the AEDC is to provide a snapshot of the development and wellbeing of young children across five areas of development, to help inform and evaluate early childhood policy, planning and service delivery. It is a population measure of how well children and families are supported up to school age — it is not designed to be an individual diagnostic tool (DET, sub. DR143). Even though the census is administered in schools, the results reflect a child's early development before school.

Service quality and other early childhood education and care data

Data on ECEC service providers are collected by the Australian Children's Education and Care Quality Authority through the *National Quality Agenda IT System* and include service quality data (ACECQA, sub. 11). The service quality data arise from *National Quality Standard* assessments and ratings of ECEC providers. The standards are a key element of the *National Quality Framework* — which sets a national benchmark for ECEC and outside school hours care services (ACECQA 2013a).

For the purpose of providing more in-depth data on childcare arrangements and early childhood education, the *Childhood Education and Care Survey* is administered by the ABS every three years (ABS 2015a). The survey includes information on children aged 0 to 12 years, and aims to provide information that is not captured in other collections including informal learning activities of children, working patterns of parents, and families' requirements for formal care or preschool (ABS 2015a).

Early childhood research datasets

A few recent projects have been initiated to link data from early childhood (including education data) for research purposes. Three notable initiatives, expanded on below, are:

- the Australian Institute of Health and Welfare's (AIHW) *National Early Childhood Development Researchable Data Set* (NECD RD)
- the ABS's work with national, state and territory government education departments to link major ECEC data collections
- the Murdoch Childrens Research Institute's (MCRI) proposed *Generation Victoria* (Gen V) project for health and education data.

National Early Childhood Development Researchable Data Set

In 2009, COAG released the *National Early Childhood Development Strategy — Investing in the Early Years*. One of the key reform priorities was to provide an evidence base for early childhood development (AIHW 2014b). The AIHW — an authorised Commonwealth data linking authority — was commissioned and funded by the Australian Government to develop a dataset, and started to work on the NECD RD in 2011.

The NECD RD aims to link Australian and state government administrative data collections including birth, perinatal, childcare, preschool, AEDC and *National Assessment Program — Literacy and Numeracy* (NAPLAN) data (AIHW 2014b). The AIHW has proposed that once these data are linked, other data sources could be integrated — for example, Medicare records, the *National Death Index*, the *Australian Immunisation Register*, jurisdictional emergency department data collections (covering injury surveillance), the Centrelink payments collection (including Family Tax Benefit information), data from disability service providers, the *Child Dental Health Survey*, the *ABS National Health Survey* and the *Australian National Infant Feeding Survey* (AIHW 2014b).

Once established, AIHW hopes that the NECD RD will enable research in early childhood development across health, human services and ECEC. The project is on hold as the AIHW is negotiating data agreements with each state and awaiting further resources from the Australian Government (AIHW, sub. 55).

ABS early childhood data linkage project

A more recent initiative by the ABS has made progress in linking data from the 2015 AEDC, the 2013 and 2014 NECECC and service quality data from the *National Quality Agenda IT System* (ABS, sub. DR105). This work has been undertaken with strong support from Australian and state and territory government education departments. The dataset has been used heavily to improve understandings of the relationships between ECEC enrolment and attendance, and early childhood developmental vulnerabilities (ABS, sub. DR105).

This dataset is being reviewed by education stakeholders in a secure environment and may become more widely accessible in future. With agreement from data custodians, other datasets could be linked to further enhance its value (ABS, sub. DR105). The Victorian Government (sub. DR144, p. 3) stated that the data linkage initiative:

... should be supported as the basis for establishing a broader, longitudinal and higher quality data set that can be used at all levels of government and for research more generally, subject to appropriate privacy requirements.

Generation Victoria

The MCRI is the largest child health research institute in Australia. It has proposed a large data and research initiative called *Gen V*, which plans to provide insights into ‘how to use data to develop a dynamic platform geared towards solving pressing questions and improving children’s health, development and wellbeing’ (MCRI, sub. 47, p. 6).

A major component of this project is *Gen V 2020* — a longitudinal study that aims to follow over 100 000 Victorians born in 2019 and 2020 over their life course, using data that are collected within health and education systems at state and national levels. Proposed

data to be linked include data from newborn screenings, maternal and child health visits, AEDC, NAPLAN, the Victorian *Student Health and Wellbeing Survey*, Medicare data and more (MCRI, sub. 47).

Although the Gen V project focuses specifically on Victorian children, the MCRI (sub. DR92) considered that a national cohort could be created by linking state-based cohorts. Gen V provides an example of how data infrastructure can be created on a state-by-state basis.

School education data collections

School collections common to all states

State education departments hold a wealth of data — particularly about government schools. A number of collections across the states cover similar topic areas, but their specific content can vary by state. That said, some data within these collections are provided by schools to comply with national reporting requirements and are therefore the same across the states.

A selection of collections common to all states is listed in table C.3 and discussed briefly below. The selected collections focus on: characteristics of students, their teachers and the schools they attend; students’, parents’ and teachers’ perceptions of schools; and student development. Examples of other ‘in-common’ collection topic areas are teacher registration, distance education, home schooling, and student disability, attendance, achievement and discipline. (In some instances, these data are collected from government schools only.)

Table C.3 Selected state school collections held in common

<i>Collection</i>	<i>State</i>
Administrative and opinion data	
School Census — February	All
School Census — August	All
School Opinion Survey	All
On-entry assessment data	
Best Start Kindergarten Assessment	NSW
English Online Interview	Vic
Early Learning Record	Qld
School Entry Assessment ^a	SA
On-Entry Assessment Program	WA
Assessment of Student Competencies	NT
Performance Indicators in Primary Schools	ACT and Tas

^a Currently being developed.

School Census — February and August

Every school in Australia is required to participate in the *School Census* that occurs in August of each year. Data collected through the census are administrative (relating to schools, staff and students) and feed into the *National School Statistics Collection* compiled by the ABS. Government schools across Australia provide data to the relevant government agency in their jurisdiction, while non-government schools use the *Schools Service Point* provided by the DET.

In addition to the August collection, each state has a February school census that government schools (in all states) and non-government schools (in some states) are asked to complete for funding purposes. Data for the February collection are held by the relevant state only. While both censuses (February and August) collect a common set of information, there is some variation in the data collected across jurisdictions and between collection times — particularly in relation to government schools, which are often required to provide more information than their non-government peers.

School Opinion Survey

Under the *National Education Agreement* and the *Schools Assistance Act 2008* (Cwlth), all schools are required to report on specific items related to student, parent and staff satisfaction in their annual reports (ACARA 2016n). Hence, all schools within Australia participate in the *School Opinion Survey*.

The Education Council has approved a list of both student and parent items that must be included in the survey. The student list contains 12 questions, while the parent list contains 14 (ACARA 2016n). While the list is common across jurisdictions and school sectors, the structure and questions included in the *School Opinion Survey* still vary by state. For example, Victoria conducts three surveys — the *Attitudes to School Survey*, the *School Staff Survey* and the *Parent Opinion Survey* (VicDET 2016d); while Queensland conducts five surveys — the *Parent/Caregiver Survey*, the *Student Survey*, the *Student Survey for Special Schools*, the *Staff Survey*, and the *Principal Survey* (QldDET 2016c).

On-entry assessments

Examples of assessments used at school entry around the country are provided in box C.2. On-entry assessments are typically compulsory in government schools only. Evidence suggests that non-government schools also use them (however, data may not be held by state authorities) (CEONT 2014; CEOWA 2013). The Independent Schools Council of Australia (sub. 39) noted that most Independent schools participate in jurisdictional assessments in the early years of school.

Box C.2 Selection of school on-entry assessments

Performance Indicators in Primary Schools is a mandatory on-entry assessment in all public schools in Tasmania and the ACT. The purpose of the assessment is to assess early reading, phonics and numeracy skills. The assessment is generally done twice a year (Terms 1 and 4) and allows the teacher to gain insight into how the student goes about determining the answers to questions, not just whether the student answers correctly (ACTDET 2015; TasDoE 2016b). The assessment aims to inform parents and assist teachers in identifying students who may need early intervention.

The *On-Entry Assessment Program* is used in Western Australia to assess a student's literacy and numeracy skills. The assessment is compulsory for all Foundation Year students in public schools and has two assessment points, Term 1 and Term 4 (WADET 2010b). The assessments are the *Online Interview (English and Mathematics)*. These involve a one-to-one interview between the student and teacher using texts and downloaded purpose-specific resources. In Victoria, the English component of the *Online Interview* is mandatory in Foundation Year, and use of the Mathematics counterpart is encouraged (VicDET 2016b). The purpose of the assessment is to identify students at risk across the two domains to allow early intervention.

The *Assessment of Student Competencies* is an on-entry screening tool used in the Northern Territory. The *Assessment* is compulsory for all Foundation Year students in public schools and consists of 47 competencies across four domains: motor skills, healthy living, literacy and numeracy (NTGov 2014). Like other on-entry assessments, its purpose is to inform parents and teachers to allow planning of learning programs to meet the needs of each student.

School collections specific to certain states

There are also collections specific to certain states. These arise because of differences in policy initiatives and/or the sophistication of online data information systems used by schools and authorities to store and communicate data (more sophisticated systems are associated with larger collections). A selection of school data collections specific to certain states that arise because of differences in policy settings (for example, a focus on student wellbeing, health, connectedness, engagement, and social and emotional development) is listed in table C.4.

In addition, some non-government school peak bodies hold data on their member schools. This is more common for Catholic school associations because they operate in networks. However, within networks the holding of data depends on available resources and therefore differs across jurisdictions. Independent school associations within each state do not hold data on their member schools (ISCA, sub. 39).

Table C.4 Selected state school collections specific to jurisdictions

<i>Survey</i>	<i>Scope</i>	<i>Purpose</i>	<i>Type of data collected</i>	<i>State</i>
School Students Health Behaviours Survey	<ul style="list-style-type: none"> • All schools • Students aged 12 to 17 years 	Better understand the health behaviours of students to help improve delivery and quality of services	<ul style="list-style-type: none"> • Nutrition and eating • Height and weight • Physical activity • Injury, psychological stress, sun protection • Substance abuse 	NSW
Tell Them From Me	All government schools: <ul style="list-style-type: none"> • Primary — Years 4–6 • Secondary — Years 7–12 	Provide school principals and leaders with insight into student engagement and teacher interaction	<ul style="list-style-type: none"> • Student engagement and wellbeing • Effective learning time • Teacher effectiveness • Student aspirations • Interest and motivation 	NSW
Student Health and Wellbeing Survey (About You)	<ul style="list-style-type: none"> • All schools • Students in Years 5, 8 and 11 	Monitor health and wellbeing outcomes of children to inform policy	<ul style="list-style-type: none"> • Physical health • Psychological wellbeing • Perceived academic performance • School satisfaction • School and family relationships 	Vic
Early School Leavers Survey	<ul style="list-style-type: none"> • All schools • Sample of students who left school prior to completing Year 12 	Understand the degree to which students are leaving school early and their post-school destinations	<ul style="list-style-type: none"> • Pathways taken after leaving (work or study) 	Qld
Middle Years Development Instrument	<ul style="list-style-type: none"> • Students aged 8 to 14 years 	Provide schools, the community and government with insight into non-academic factors relevant to learning and participation	<ul style="list-style-type: none"> • Social and emotional development • Connectedness • School experiences • Physical health and wellbeing • Constructive use of afterschool time 	SA

Sources: CESE (2015b); NSWDoH (2015); QLDDDET (2016a); SADECD (2016a); VicDET (2015a).

National school education collections

Main national collections of school education data include census data on all schools, students and staff; students with disabilities; and student achievement (table C.5), and data created via point-in-time surveys and longitudinal studies (table C.6). A brief discussion of the longitudinal collections is presented in box C.3. Australia also participates in four international student assessment programs and an international teaching survey (table C.7).

Table C.5 Main national school collections — census data

<i>Collection</i>	<i>Type of data collected</i>	<i>Scope</i>
National Schools Statistics Collection (NSSC) ^a	<ul style="list-style-type: none"> • Student level — participation (full- or part-time), background, gender, age, school level (primary, secondary) and year • Staff level — school level, gender and role • School level — type (government, non-government), affiliation (Catholic, Independent), finance (government only), size of enrolments, student–staff ratio, retention measures 	All primary and secondary schools
National Data Collection ^b	<ul style="list-style-type: none"> • Participation — enrolment, attendance, participation in National Assessment Program assessments, participation in vocational education and training (VET) including VET in Schools, participation in post-schooling learning pathways and work • Achievement — National Assessment Program assessments • Attainment — school completion and attainment (Year 12 or equivalent), attainment of young people in post-school learning pathways (level of qualification), outcomes of schooling • Equity — students' Indigenous status, sex, language background, geographic location, socioeconomic background and disability 	All primary and secondary schools (Years 1 to 10)
Schools Service Point ^c	<ul style="list-style-type: none"> • Financial • Student attendance • Socioeconomic status • School census data • Other compliance data 	Non-government schools
Nationally Consistent Collection of Data on School Students with Disability (NCCD)	<ul style="list-style-type: none"> • Number of students with disability enrolled in all Australian schools • Location of these students • Broad level of adjustment being provided to assist these students 	Students with disability across all schools
National Assessment Program — Literacy and Numeracy (NAPLAN) ^{b,d}	<ul style="list-style-type: none"> • Reading • Writing (persuasive and narrative) • Language conventions (spelling, grammar and punctuation) • Numeracy 	All students in Years 3, 5, 7 and 9
Higher Education Statistics Collection	<ul style="list-style-type: none"> • Personal characteristics • Enrolment information • Education history 	All students enrolled in higher education (including teachers)

^a Derived from the annual School Census. The ABS works with the various state departments of education, the Australian Government Department of Education and Training, and the Education Council to create the collection. ^b Compiled nationally by the Australian Curriculum, Assessment and Reporting Authority in accordance with the *Schedule of Key Performance Measures* and data sources established in the *Measurement Framework for Schooling in Australia 2015*. ^c Subset provided to the ABS for the *National School Statistics Collection*. ^d Part of the *National Assessment Program*.

Sources: ABS (2016f); ACARA (2013e, 2013d, 2015b, 2015e); DET (2015c, 2016f); Education Council (2016b).

Table C.6 Main national school collections — point-in-time and longitudinal data

<i>Collection</i>	<i>Topics of data collection</i>	<i>Scope</i>
Point-in-time		
NAP sample assessment ^a	<ul style="list-style-type: none"> • Science • Civics and citizenship • Information and communication literacy 	<ul style="list-style-type: none"> • Year 6 • Years 6 and 10 • Years 6 and 10
Australian Child Wellbeing Project ^b	<ul style="list-style-type: none"> • Family, health, demographics, money, maternal wellbeing • Friends, school, community and neighbourhood • Other areas of wellbeing 	Students aged 8 to 14 years (Years 4, 6 and 8) across all school sectors
Staff in Australia's Schools Survey (SiAS)	<ul style="list-style-type: none"> • Background, qualifications • Work, career intentions • School staffing issues 	School teachers and leaders in all primary and secondary schools
Longitudinal		
Longitudinal Study of Australian Children (LSAC)	<ul style="list-style-type: none"> • Learning and cognition outcomes, social and emotional development • Child health status, health behaviour, risk factors • Family demographics, relationships, parent status, parenting • Family finances, paid work, housing • Home education and learning environment, social capital • Program characteristics (school, preschool, childcare) 	<ul style="list-style-type: none"> • B cohort — children aged 0 to 1 year at survey entry • K cohort — children aged 4 to 5 years at survey entry
Longitudinal Study of Indigenous Children (LSIC)	<ul style="list-style-type: none"> • Children — physical and mental health, social and cognitive development, family and community relationships, significant events • Children's families — health, work, lifestyle and family, community connectedness • Children's communities — facilities, services, social and community issues • Services — childcare, education, health, other services used 	<ul style="list-style-type: none"> • B cohort — children aged 6 to 18 months at survey entry • K cohort — children aged 3.5 to 5 years at survey entry
Longitudinal Survey of Australian Youth (LSAY)	<p>First wave:</p> <ul style="list-style-type: none"> • student/individual — literacy and numeracy skills, demographic background, study and vocational plans, attitudes to school • school — resources, environment, staff qualifications, teacher morale <p>Subsequent waves — individual:</p> <ul style="list-style-type: none"> • educational participation, attainment (completion of highest level of schooling) and performance (academic) in school, vocational training, higher education • employment, job history, job-seeking activities • living arrangements, finance, health 	Students aged 15 years or in Year 9

^a Part of the *National Assessment Program* (NAP). Run on a rolling basis every three years since 2003.

^b First conducted in 2015. The survey is designed to be internationally comparable as survey items are taken from two international surveys — the *Health Behaviour in School-aged Children* and the *Children's Worlds* survey.

Sources: ACER (2016d); ACARA (2013b, 2013c, 2013g); DET (2016e); DSS (2015a); Edwards (2012); Nguyen et al. (2010); Redmond et al. (2016).

Box C.3 Longitudinal data collections

Longitudinal Study of Australian Children

The *Longitudinal Study of Australian Children* (LSAC), also known as *Growing Up in Australia*, has followed the development of Australian children and their families since 2004 (DSS 2015c). The first wave included 10 000 children across two age cohorts (Edwards 2012). The LSAC intends to follow children for at least 14 years. The participants include the child and their parents, carers and teachers. Data collection occurs every two years and, to date, six collection waves have been completed.

The LSAC is funded by the Australian Government and managed by the National Centre for Longitudinal Data — within the Department of Social Services — in partnership with the Australian Institute of Family Studies, the ABS, a group of researchers from universities and research organisations across Australia and a Data Expert Reference Group. The Data Expert Reference Group consists of representatives from the Department of Social Services, the Australian Institute of Family Studies and the ABS, as well as external statistical experts (AIFS 2015a; DSS 2015c).

Longitudinal Study of Indigenous Children

The *Longitudinal Study of Indigenous Children* (LSIC), also known as *Footprints in Time*, is an ongoing study that has followed the development of two age cohorts of Indigenous children and their families in Australia since 2008 (DSS 2015b). The LSIC began with over 1600 Indigenous children across the two cohorts (DSS 2015b). The sample selection process was non-random in design and the sample was not nationally representative. Instead, it was designed to be broadly reflective of the geographic distribution of Indigenous Australian children aged 0 to 5 years across Australian states and across urban, regional and remote areas (DSS 2015a). Data are collected from children and their parents approximately annually and, to date, eight waves of data collection have been completed (DSS 2015b).

Initiated and funded by the Australian Government, LSIC is managed within the Department of Social Services by the National Centre for Longitudinal Data, with involvement from the *Footprints in Time* Steering Committee, the Longitudinal Studies Advisory Group and contractors (DSS 2015a).

Longitudinal Survey of Australian Youth

The *Longitudinal Survey of Australian Youth* (LSAY) is a research program that follows young Australians as they transition from compulsory schooling to further study, work and other pursuits. The sample — initially 10 000 participants — is surveyed annually over 10 years. To date, LSAY has included six cohorts — 1995, 1998, 2003, 2006, 2009 and 2015 (DET 2015a).

The LSAY is funded and managed by the Australian Government Department of Education, with involvement from the National Centre for Vocational Education Research and the Wallis Consulting Group (DET 2015d).

Table C.7 Selected national school collections — international collections^a

<i>Collection</i>	<i>Topics of data collection</i>	<i>Scope</i>	<i>Frequency (years)</i>
Programme for International Student Assessment (PISA) ^{b,c}	<ul style="list-style-type: none"> • Assessment in reading, mathematics and science • Non-cognitive information • Contextual information on students and schools 	Students aged 15 years	Three
Trends in International Mathematics and Science Study (TIMSS) ^{c,d}	<ul style="list-style-type: none"> • Assessment in mathematics and science • Contextual information on students and schools 	Students in Years 4 and 8	Four
Progress in International Reading Literacy Study (PIRLS) ^{c,d}	<ul style="list-style-type: none"> • Assessment in reading • Contextual information on students and schools 	Students in Year 4	Five
International Computer and Information Literacy Study (ICILS) ^d	<ul style="list-style-type: none"> • Assessment in computer and information literacy • Contextual information on students and schools 	Students in Year 8	Five
Teaching and Learning International Survey (TALIS) ^b	<ul style="list-style-type: none"> • Learning environment • Appraisal and feedback • Teaching practices and classroom environment • Development and support • School leadership • Self-efficacy and job satisfaction 	Teachers (Year 7 to 10) and principals	Five

^a The Australian Council for Educational Research is responsible for collecting data for all international data collections. ^b The OECD is responsible for the collection. ^c Part of Australia's *National Assessment Program*. ^d The International Association for the Evaluation of Educational Achievement International Study Centre is responsible for the collection.

Sources: ACER (2016e); ACARA (2013a); DET (2016e); IEA (2016a, 2016b); OECD (2015a, 2015d).

C.2 Data on external influences on education outcomes

Data that pertain to external influences (factors that affect education outcomes but that are not directly influenced by the education system) are an important input into research about education outcomes (chapter 2). A selection of national data collections that contain data on health, social services, demographics and the labour force are listed in table C.8.

Table C.8 Selected national collections on external influences

<i>Type of data</i>	<i>Data collections</i>
Health	<ul style="list-style-type: none"> • National Perinatal Data Collection • Maternity Information Matrix • Medicare data • Australian Childhood Immunisation Register • Child Health Records • National Health Survey • Australian National Infant Feeding Survey • National Nutrition and Physical Activity Survey • Australian Child and Adolescent Survey of Mental Health and Wellbeing
Social services	<ul style="list-style-type: none"> • Centrelink data — including receipt of Family Tax Benefit • Child protection data
Demographics	<ul style="list-style-type: none"> • Census of Population and Housing • Household, Income and Labour Dynamics in Australia Survey (HILDA) • Australian Tax Office data
Labour force	<ul style="list-style-type: none"> • Labour Force Survey • Survey of Education and Training • Survey of Education and Work • Work Related Training and Adult Learning Survey

C.3 The main sources of education information

A range of publications regularly report on ECEC or school data. Most data reporting pertains to monitoring and benchmarking, and contributes to accountability and transparency in the education sector. Data are reported in a range of ways, including via annual reports and regular statistical publications and through avenues such as reports to parents and online portals.

There are also some publications and data portals that report on a wider suite of indicators. For example, the AIHW’s *Children’s Headline Indicators* contains 19 indicators of health, development and wellbeing for children aged 0 to 12, including five that relate to education (AIHW 2016a, sub. DR128). The remainder of this section provides examples of publications that report specifically on data from the education sector.

Regular early childhood education and care data publications

There are multiple publications of ECEC data (a selection is presented in table C.9). Some focus solely on preschools, while others cover both preschools and childcare.

Table C.9 A selection of reporting for ECEC

<i>Publication name</i>	<i>Purpose</i>	<i>Data collections used^a</i>	<i>Publisher^b</i>
Early Childhood and Child Care in Summary	Reports on the number of children and families using approved childcare, the costs of care and the number and types of childcare services in Australia	<ul style="list-style-type: none"> • CCMS • NQA ITS 	DET (2016d)
National ECEC Workforce Census Report	Overview of the ECEC workforce, characteristics of childcare services, preschool programs and staff insights	<ul style="list-style-type: none"> • National ECEC Workforce Census 	SRC (2014)
Preschool Education, Australia	Presents a range of statistics on children enrolled in and attending a preschool program	<ul style="list-style-type: none"> • NECECC 	ABS (2016c)
Childhood Education and Care, Australia	Presents information on children in both childcare and preschool	<ul style="list-style-type: none"> • Childhood Education and Care Survey 	ABS (2015a)
ACECQA Annual Report	Reports a range of statistics collected on service providers including data pertaining to National Quality Standard assessment and ratings	<ul style="list-style-type: none"> • NQA ITS 	ACECQA (2015)
National Quality Framework Snapshot (quarterly)	Reports on the state and profile of the sector, progress of assessment and rating, and the quality of rating of services	<ul style="list-style-type: none"> • NQA ITS 	ACECQA (2016b)
Report on Government Services	Reports on equity and effectiveness of government services, including early childhood development, in Australia	<ul style="list-style-type: none"> • DET data • State departments of education data • NECECC • NQA ITS • AEDC 	SCRGSP (2016b)
Australian Early Development Census National Report ^c	Snapshot (community, state and national) of the development and wellbeing of young children to help inform policy, planning and service delivery	<ul style="list-style-type: none"> • AEDC 	DET (2016b)

^a Child Care Management System (CCMS); National Quality Agenda IT System (NQA ITS); National Early Childhood Education and Care Collection (NECECC); Australian Government Department of Education and Training (DET); Australian Early Development Census (AEDC). ^b Australian Children's Education and Care Quality Authority (ACECQA); Australian Government Department of Education and Training (DET); Steering Committee for the Review of Government Service Provision (SCRGSP); Social Research Centre (SRC). ^c School-level data are available to the school only through School Profiles.

Regular school education data publications

Government and non-government bodies are responsible for a range of publications on school education (table C.10). In addition, schools publish annual reports and the Australian Council for Educational Research publishes results from the international assessments that it manages, such as the *Programme for International Student Assessment* (PISA) (ACER 2016e).

Table C.10 A selection of reporting for school education

<i>Name of publication</i>	<i>Purpose</i>	<i>Data collections used^a</i>	<i>Publisher^b</i>
National Report on Schooling in Australia	Reports Australia's progress towards national education objectives	<ul style="list-style-type: none"> • NSSC • National Data Collection 	ACARA (2016l)
NAP reports	Provides a national comparison of student performance against the relevant framework	<ul style="list-style-type: none"> • NAP assessments 	ACARA (2013i)
Schools, Australia	Presents a range of statistics on students in schools across Australia	<ul style="list-style-type: none"> • NSSC 	ABS (2016f)
Report on Government Services	Reports on equity and effectiveness of government services, including school education, in Australia	<ul style="list-style-type: none"> • NSSC • National Data Collection • NAP assessments 	SCRGSP (2016b)
Initial Teacher Education: Data Report	Reports on teacher quality and direction of initial teacher education in Australia	<ul style="list-style-type: none"> • Higher Education Statistics Collection • Staff in Australia's Schools Survey 	AITSL (2015b)

^a National School Statistics Collection (NSSC); National Assessment Program (NAP). ^b Australian Curriculum, Assessment and Reporting Authority (ACARA); Australian Institute for Teaching and School Leadership (AITSL); Steering Committee for the Review of Government Service Provision (SCRGSP).

Regular reporting to parents

In ECEC, reporting to parents includes reports or statements on a child's development and learning. For example, although generally not compulsory, several jurisdictions — New South Wales, Victoria³⁶, Queensland and South Australia — encourage the use of a *Transition to School Statement* (NSWDoE 2015; QldDET 2015b; VicDET 2016e) or a *Progress Report* (SADECD 2016c) when a child is transitioning from preschool to the Foundation Year of primary school. The purpose of the statement or report is to provide information to parents and would-be teachers of a child to help plan for the child's learning development when they start school. Reporting to parents also consists of results of any formal assessments carried out, such as the *Kindergarten Development Check* (table C.1).

³⁶ Compulsory for all government managed and funded preschool providers.

Schools provide parents with student reports at least twice a year that outline student progress (mandated by the *Australian Education Act 2013* (Cwlth)). Schools might also hold parent–teacher interviews and communicate results of classroom-based standardised assessments, such as the *Progressive Achievement Tests*. Student portfolios and work samples are increasingly being used to demonstrate learning outcomes (APPA, sub. DR89). Also, all students who participate in NAPLAN receive an individual report of their results from the Australian Curriculum, Assessment and Reporting Authority that outlines what the student knows and has achieved in the discipline areas tested and how they have performed in relation to others in the same year group, against the national average and national minimum standards (ACARA 2013h).

Data portals

A number of data portals aggregate, publish and provide access to data to inform the wider community, and for research purposes (table C.11).

Table C.11 A selection of data portals

<i>Name</i>	<i>Purpose</i>	<i>Data collections used^a</i>
My Child	Allows parents to search for childcare centres and preschools across Australia, and view their vacancy and fee information, and quality ratings against the <i>National Quality Framework</i>	<ul style="list-style-type: none"> • CCMS • NQA ITS
My School	<ul style="list-style-type: none"> • Provides information on each school's student profile, NAPLAN performance, enrolment numbers, attendance rates, funding levels and sources, and other financial information • Helps in understanding how schools with statistically similar backgrounds perform relative to one another and what financial resources are available to each school • Encourages parental engagement in their child's learning 	<ul style="list-style-type: none"> • NAPLAN • National Data Collection
Victorian Child and Adolescent Monitoring System	Tracks and measures children's and young people's health, wellbeing and safety, learning and development outcomes in Victoria, as identified in the <i>Victorian Child and Adolescent Monitoring System Outcomes Framework</i> that includes 35 evidence-based outcomes and 150 indicators across health, wellbeing and safety, learning and development	<ul style="list-style-type: none"> • NAPLAN • AEDC • School Census • Preschool Census • Victorian and National Surveys
New South Wales Education Datahub ^b	Provides access to various government education datasets (currently over 100) across both ECEC and school education	<ul style="list-style-type: none"> • NAPLAN • National School Statistics Collection • National Data Collection

^a Child Care Management System (CCMS); National Quality Agenda IT System (NQA ITS); National Assessment Program — Literacy and Numeracy (NAPLAN); Australian Early Development Census (AEDC). ^b Within the Centre for Education Statistics and Evaluation.

Sources: ACARA (2015c, 2015h); Australian Government (2016); CESE (2016e); VicDET (2016f).

C.4 The main sources of education evidence

A key way in which education data are used is to evaluate the effectiveness and value for money of policies, programs and practices. This evidence is disseminated to education decision makers through evidence repositories, including clearinghouses, peer-reviewed journals and other resources. Evidence is also shared through networks and partnerships of education providers and students' families.

Evidence repositories

Several Australian and international clearinghouses (table C.12) identify, compile and disseminate evidence created through education research.

Table C.12 A selection of Australian and international education clearinghouses

<i>Name</i>	<i>Purpose</i>	<i>Managed by/country^a</i>
Australian		
Teaching & Learning Toolkit	<ul style="list-style-type: none"> • Improve the learning outcomes of students in Australian schools, especially those experiencing disadvantage • Provide funding for research into Australian educational practice and share the evidence via a free online toolkit • Toolkit summarises research (Australian and international) into 34 interventions to improve academic achievement (outlining each intervention's average impact on achievement, the strength of the evidence used to determine that average impact, and the average cost of implementation) 	<ul style="list-style-type: none"> • EEF • SVA^b
Professional Learning Clearinghouse	<ul style="list-style-type: none"> • Support teachers and school leaders — across early childhood and school education — to make evidence-based decisions about professional development and teaching strategies in the classroom • Provide teachers and school leaders with access to education research on effective professional and teaching strategies in the classroom 	<ul style="list-style-type: none"> • CESE
School Leadership eCollection	<ul style="list-style-type: none"> • Support the leadership of school leaders through the collection and dissemination of the latest research, strategies and resources in the field of education 	<ul style="list-style-type: none"> • AITSL^c
Closing the Gap Clearinghouse	<ul style="list-style-type: none"> • Provide an evidence base for overcoming Indigenous disadvantage by providing quality-assessed research on what works to improve current and future policies 	<ul style="list-style-type: none"> • AIHW • AIFS

(Continued next page)

Table C.12 (continued)

Name	Purpose	Managed by/country ^a
International		
What Works Clearinghouse ^d	<ul style="list-style-type: none"> • Provide information to researchers, educators and policy makers about strategies for improving education outcomes for students • Identify studies (through critical assessments) that offer credible and reliable evidence of the effectiveness of a given practice or initiative and disseminate the information on its website 	• US
Danish Clearinghouse for Educational Research ^e	<ul style="list-style-type: none"> • Compile knowledge regarding good evidence-informed educational practice (early childhood and school education) • Analyse and disseminate knowledge to educators and policy makers to help improve student outcomes 	• Denmark
Education Endowment Foundation ^f	<ul style="list-style-type: none"> • Raise the attainment of students by identifying and funding promising educational innovations that address the needs of students in schools • Provide toolkits pertaining to both early childhood and school education that can be used to improve the attainment of students 	• UK

^a Social Ventures Australia (SVA); Education Endowment Foundation (EEF); Centre for Education Statistics and Evaluation (CESE); Australian Institute for Teaching and School Leadership (AITSL); Australian Institute of Health and Welfare (AIHW); Australian Institute of Family Studies (AIFS). ^b Funded in partnership with the Commonwealth Bank of Australia and developed by the Victorian Department of Education and Training and the Education Endowment Foundation. ^c Developed in collaboration with Education Services Australia. ^d Established in 2002. ^e Established in 2006. ^f Founded in 2011.

Sources: Aarhus University (2016); AIHW (2016b); AITSL (2014b); CESE (2016a); EEF (2016a, 2016b); IES (2016b); SVA (2015).

Peer-reviewed journal articles also inform policy, practice and programs. Well-known high-quality peer-reviewed journals include the *Review of Educational Research*, the *American Educational Research Journal* and the *Learning and Instruction Journal*.

Numerous other resources are available to education decision makers, and include:

- the *Australian Education Index* and *National School Improvement Tool* (ACER 2016a, 2016b)
- the *Teacher Toolkit* (AITSL 2016)
- *Effective Practices in Literacy and Numeracy* (CESE 2016b)
- the *Early Childhood Resource Hub* (ESA 2016)
- government-approved frameworks and resources such as *Belonging, Being and Becoming: The Early Years Learning Framework for Australia* (DEEWR 2009) and *Reflect, Respect and Relate: Assessing for Learning and Development in the Early Years using Observations Scales* (SADECS 2010).

A selection of these resources is described in more detail in box C.4.

Box C.4 A selection of other evidence resources

Australian Education Index

The Cunningham Library at the Australian Council for Educational Research produces the *Australian Education Index* — a database that consists of more than 200 000 pieces of information relating to educational research, policy and practice, built over 58 years (ACER 2016a, sub. DR131). Access is available via subscription (ACER 2016a). Subjects covered in the Index are vast and include early childhood, primary, secondary, Indigenous and teacher education, and teaching (ACER 2016a).

Teacher Toolkit

The *Teacher Toolkit* — provided by the Australian Institute for Teaching and School Leadership (AITSL) — is a resource that consists of online tools and resources aimed at supporting quality teaching (AITSL 2016). The toolkit is organised into seven categories: classroom practice; collaboration; professional learning; standards; self-assessment and reflection; performance and development; and coaching and mentoring. Each of these seven areas is further disaggregated into separate areas. For example, classroom practice consists of eight different resources, one of which is the *Classroom Practice Continuum*.

The *Classroom Practice Continuum* incorporates the Australian Professional Standards for Teachers and its purpose is to demonstrate what teachers at increasing levels of expertise do in the classroom (AITSL 2014a). The *Continuum* is accompanied by the *Looking at Classroom Practice* resource guide, which is aimed at assisting educators in developing a greater understanding of the nature of expertise and the various observation procedures and guides pertaining to observation (AITSL 2014a).

Networks and partnerships

Various networks of educators and other decision makers share evidence with their members to improve education practices. For example:

- Early Childhood Australia provides fortnightly newsletters, practice guidelines and video resources that demonstrate effective practices (ECA 2016b)
- the Teacher Learning Network (which is supported by Victorian branches of the Australian Education Union and Independent Education Union) supports educators across both schools and ECEC providers through professional development programs and its practitioner-focused journal (TLN nd)
- associations for particular subject specialisations, such as the Australian Association for the Teaching of English (AATE 2016), the Australian Association of Mathematics Teachers (AAMT 2016) and the Australian Science Teachers Association (ASTA 2016), provide teaching resources specific to that subject
- the Australian Parent Engagement Network provides access to research, resources and practice tips relating to parent engagement. Its members include researchers, educators, parents, policy makers, community organisations and others (ARACY nda, ndc).

Teachers can also receive information on teaching practices through online professional learning networks. These networks allow teachers to connect with others across the world for support, feedback and opportunities for collaboration. Social media tools (including social networking sites, collaborative web pages and instant messaging) are a major form in which these networks operate (Trust 2012; VicDET 2015b).

Schools can also disseminate home-based learning materials and resources to parents (Emerson et al. 2012). Engaging parents (through family–school partnerships, for example) provides opportunities to share evidence between teachers and parents on how to improve education outcomes for individual students.

C.5 Issues concerning evidence hierarchies and randomised controlled trials

Although there is a lot of evidence on what works in education, not all evidence is created equal. As discussed in chapter 7, some techniques are preferred to others for creating high-quality evidence on the impact of practices, programs or policies. These techniques are often ranked in hierarchies, with randomised controlled trials (RCTs) frequently placed at or near the top of the hierarchy.

A number of inquiry participants raised concerns about definitions of high-quality evidence and about the use of RCTs in education (including AARE, sub. DR114; CIS, sub. DR126; Deakin University School of Education, sub. DR136; Good Shepherd, sub. DR118; SERC, sub. DR123; UTas Faculty of Education, sub. DR90). These concerns are explored in this section.

Evidence hierarchies

Evidence hierarchies based on study design have been contested for a number of reasons. Nutley, Powell and Davies (2013) discussed five challenges to these types of hierarchies:

- the strength of evidence and cost-effectiveness of well-conducted observational studies tend to be underrated (the STEM Education Research Centre (sub. DR123) raised a similar point)³⁷
- some hierarchies do not consider the quality of a study (irrespective of technique)
- using hierarchies to exclude lower ranking studies can lead to a loss of useful evidence
- hierarchies typically pay insufficient attention to the theory underlying an intervention (which can help in understanding how it works)

³⁷ However, evidence on the relative merits of observational studies is mixed. While some studies suggest that RCTs and observational studies deliver similar estimates of the impact of an intervention (for example, Concato, Shah and Horwitz 2000), other studies find marked differences in estimates between the two methods (Ioannidis et al. 2001).

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- hierarchies provide an insufficient basis for recommending the use of a particular practice or program.

Only the first point relates to the types of techniques included. Overall, these challenges do not suggest that hierarchies that privilege (well-designed and implemented) RCTs and natural experiments as high-quality methods are wide of the mark for generating evidence on what works.

Randomised controlled trials

However, a number of participants raised concerns specifically about RCTs, including that:

- they require large samples (Good Shepherd, sub. DR118; Ladwig, sub. DR137)
- they can only be used where outcomes can be measured (Good Shepherd, sub. DR118; Deakin University School of Education, sub. DR136)
- the complexity of the education environment can lead to variation in how an initiative is implemented across trial sites and in how practitioners translate trial results, meaning that the control group ‘consists of a wide variety of practices in a wide range of circumstances’ (Deakin University School of Education, sub. DR136, p. 7)
- they reflect the impact of an initiative on the average member of a group but that a different impact might apply for subgroups (SERC, sub. DR123).

Ensuring that the data sample used in an analysis is sufficiently large to support statistically valid results is a critical issue for all research methods that seek to convincingly demonstrate causality (including those described in chapter 7, box 7.1). In the case of RCTs, the use of baseline data can reduce the size of sample required (Hutchison and Styles 2010), giving RCTs an advantage over techniques that only have data on end-of-trial outcomes. Examples of RCTs run in education indicate that sample sizes do not have to be onerously large. Some trials run by the UK Education Endowment Foundation, for example, have involved whole year levels in fewer than 60 schools.

Similarly, concerns about the measurement of outcomes and the complexity of the education environment apply to all techniques that aim to quantify the impact of an initiative, not just to RCTs. Furthermore, if the implementation of an initiative varies in a trial, it will most likely vary when adopted subsequently. Trial results give a sense of the likely effect of an initiative, given the complexity of the environment. Finally, the fact that RCTs permit researchers to take into account the complexity of the environment gives them an advantage over techniques where it would be impossible to measure, and control for, the multiple factors that can influence outcomes.

The final concern, the potential that the average finding does not apply for all group members, could also be raised for other techniques. If supplementary evidence (through process evaluations, as discussed in chapter 7) suggests this is the case, research that looks specifically at particular subgroups might be warranted.

The potential to run a process evaluation to gain answers to these questions is another advantage of an RCT over a number of the alternative methods for determining the impact of an intervention.

That said, RCTs are not always the answer and there are some circumstances in which other techniques may be preferred (chapter 7).

In some cases, ethical concerns might prevent the conduct of a trial. While there may be concerns about trial participants receiving a treatment that may advantage or disadvantage them, continuing to use approaches of unknown efficacy could also be seen as unethical. Ethical issues have to be considered as part of research approval processes. (The role of ethics committees is discussed in chapter 5.)

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