



Australian Government  
Productivity Commission

## National Education Evidence Base

## Productivity Commission Issues Paper

April 2016

The Commission has released this issues paper to assist individuals and organisations to prepare submissions.

It contains and outlines:

- the scope of the study
- the Commission's procedures
- matters about which the Commission is seeking comment and information
- how to make a submission.

## The Issues Paper

The Commission has released this issues paper to assist individuals and organisations to prepare submissions to the inquiry. It contains and outlines:

- the scope of the inquiry
- a proposed framework for considering education data arrangements
- matters about which the Commission is seeking comment and information
- how to make a submission.

Participants should not feel that they are restricted to comment only on matters raised in the issues paper. The Commission wishes to receive information and comment on issues which participants consider relevant to the inquiry's terms of reference.

## Key inquiry dates

Receipt of terms of reference	11 March 2016
Release issues paper	11 April 2016
Due date for submissions	25 May 2016
Release of draft report	August 2016
Draft report submissions	October 2016
Draft report public hearings	October 2016
Final report to Government	9 December 2016

## Submissions can be made

By email:	education.evidence@pc.gov.au
By post:	National Education Evidence Base Productivity Commission Locked Bag 2, Collins St East PO Melbourne VIC 8003

## Contacts

Administrative matters:	Yvette Goss	Ph: 03 9653 2253
Other matters:	David Garner	Ph: 03 9653 2227
Freecall number for regional areas:	1800 020 083	
Website:	<a href="http://www.pc.gov.au">www.pc.gov.au</a>	

## The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website ([www.pc.gov.au](http://www.pc.gov.au)).

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## **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.

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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

11 March 2016

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# 1 What has the Commission been asked to do?

The Australian Government has asked the Productivity Commission to undertake a public inquiry into the further development of the national evidence base for school and early childhood education.

The Commission has been asked 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 relevant information, to inform policy development and improve Australia's educational outcomes.

In undertaking this inquiry, the Commission has been asked to report on and make recommendations about:

- the kinds of data that are needed to support a comprehensive evidence base to monitor educational outcomes and to inform policy development and evaluation in early childhood and school education
- any additional kinds of data that could add value to the existing evidence base, such as data on non-cognitive skills of students and relevant information from outside the education sector
- barriers to sharing or accessing data, and how these can be overcome; such as privacy concerns and national and jurisdictional data governance structures and protocols
- the role of technology in supporting the scope, quality and timeliness of data collection and reporting
- the costs and benefits of options for improvements to the national education evidence base.

## How can you contribute to the inquiry?

This issues paper is intended to assist participants in preparing a submission. It sets out some of the issues and questions the Commission has identified as relevant at this early stage of the inquiry. There is no need to comment on every issue raised in this paper and participants are welcome to submit material on issues not raised in this paper, provided they are relevant to the inquiry's terms of reference. Participants should provide evidence to support their views, including data and specific examples where possible.

Submissions should be provided to the Commission by **25 May 2016** for consideration in the draft report. Attachment A provides further details on how to make a submission.

Following the receipt of written submissions, the Commission will prepare a draft inquiry report which will be released in **August 2016**. Interested parties will have an opportunity to comment on the draft report at public hearings and through further written submissions.

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A final inquiry report will then be prepared and provided to the Australian Government by **9 December 2016**.

## **The Commission's approach**

The focus of the Commission will be on assessing the costs and benefits of options for improvements to the education data underpinning the national education evidence base, guided by the terms of reference. This includes consideration of the administrative and financial impacts of any suggested change in data collection practices and of opportunities to increase efficiency in relation to existing data collections.

In undertaking this task, the Commission will draw on its own research and analysis, evidence provided by participants, the findings of other relevant reviews and lessons from approaches adopted in other countries.

In keeping with its legislative remit, the Commission will take a communitywide, evidence-based and transparent approach to assessing the costs and benefits of any proposed options.

## **Scope of the inquiry**

The terms of reference direct the Commission to examine issues relating to 'data for early childhood education and care and schools, and other information as relevant'. This could be interpreted broadly, to include data relating to the outcomes, conditions and circumstances of children set out below:

- Australian children aged from birth to five years, as per the scope of early childhood education and care set out under the national *Early Years Learning Framework* (Department of Education, Employment and Workplace Relations 2009) and related documents. This includes children who attend early childhood education and care programs as well as those who do not attend any such programs prior to beginning compulsory schooling. Data on the developmental outcomes and circumstances of both groups of children are relevant
- Australian school students, from Foundation Year (the first year of compulsory schooling) to Year 12, as well as children and young people who are eligible to attend school but do not attend.

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#### QUESTIONS

- *Does this interpretation of the scope of the terms of reference accord with yours?*
  - *In particular, should the scope of the evidence base include data on children younger than 4 years old (or prior to the year before compulsory schooling begins)? If so, why, and should it cover all children, or only those attending early childhood education and care programs outside the home?*
  - *Should the evidence base include data on young people who have left school before completing Year 12, or who do not attend school for other reasons (for example, homeschooled children)?*
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The Australian Government has also asked the Commission to undertake an inquiry into the benefits and costs of increasing the availability and use of public and private data by Australian individuals and organisations (box 1).

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#### **Box 1      Data Availability and Use Inquiry**

This inquiry is due to report in March 2017, The Commission is required to:

- examine options for collection, sharing and release of data
- identify ways consumers can use and benefit from access to data, particularly data about themselves
- consider how to preserve individual privacy and control over data use.

The Data Availability and Use Inquiry is a 12 month inquiry with a later timetable for submissions and the draft report. Participants to the National Education Evidence Base Inquiry are welcome to also submit relevant material to the other inquiry.

Further information on this inquiry is available at <http://www.pc.gov.au/inquiries/current/data-access>.

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## 2 Objectives and framework

Education data consist of the data holdings and research that underpin the national education evidence base (box 2). As noted in the inquiry terms of reference, the purpose of the education evidence base is to support and evaluate Australia's progress towards national education objectives, through monitoring of education outcomes and informing policy development and evaluation. The research purposes of data are an important consideration in decisions about the relevant data to collect and use. However, it is proposed that the main focus of this inquiry is about the underlying data, rather than on educational research literature (particularly with respect to analyses of 'what works' in teaching and learning in schools).

### Australia's national education objectives

Generally, the delivery of school and early childhood education is the responsibility of state and territory governments and the non-government sector. Funding is provided by the Australian Government, states and territories and students' families. Over the past decade there has been an increasingly shared approach between the Australian, state and territory governments to curricula, assessment and reporting. This has included the articulation of national educational objectives in policy and curriculum documents.

Some key documents are listed below.

- *Melbourne Declaration on Educational Goals for Young Australians* (Ministerial Council on Education, Employment, Training and Youth Affairs 2008)
- *National Education Agreement* (COAG 2009, updated in 2012)
- *Early Years Learning Framework* (Department of Education, Employment and Workplace Relations 2009)

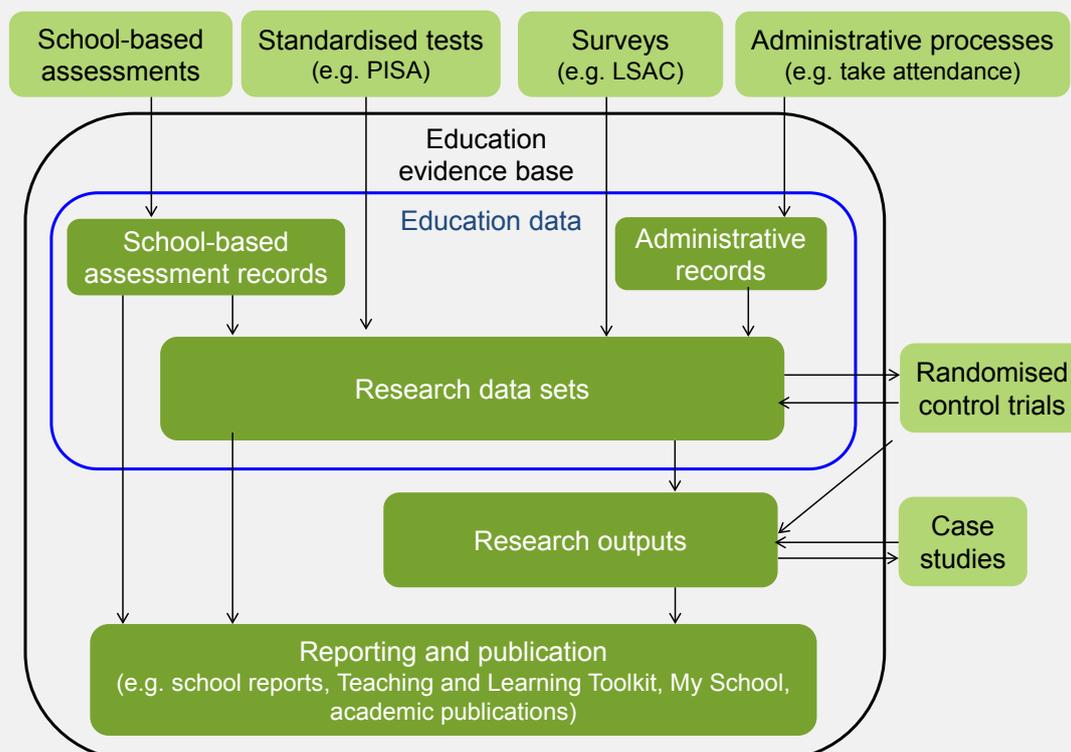
## Box 2 Education data, research datasets and the national education evidence base

In accordance with the terms of reference, the focus of this inquiry is on the data that underpin the national evidence base for school and early childhood education — defined here as **education data**. However, data can be viewed as just one (albeit essential) ingredient of an evidence base. A broader definition of the **national education evidence base** could also include educational research literature and analyses, and their availability and accessibility.

Within education data, a distinction can be drawn between research datasets and administrative records.

- **Research datasets:** Those that are readily accessible for researchers to use in answering research questions. These include datasets that are designed and collected for research purposes (for example, the Longitudinal Study of Australian Children). It also includes those administrative datasets that have been created to be usable or potentially usable for research purposes (for example, the National Assessment Program – Literacy and Numeracy dataset compiled by the Australian Curriculum, Assessment and Reporting Authority).
- **Administrative records:** Administrative datasets that have potentially useful information, but that are not readily accessible for research purposes because they are collected and used for management and administration purposes and not in a state to be made available for research purposes.

Potentially useful data could come from diverse sources, ranging from larger-scale processes such as surveys and standardised tests to school-based assessments and administrative systems, and smaller-scale sources such as randomised control trials and case studies. This schematic represents a view of these sources and how they might contribute to education data and the evidence base.



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The objectives set out in documents referred to above share a common view that children and young people should be equipped with the tools necessary for effective social and economic participation, for their own wellbeing and quality of life, and for the benefit of the community as a whole. The stated objectives typically cover academic domains such as literacy and numeracy, as well as broader developmental and non-cognitive domains, such as social and emotional development and wellbeing. (For example, the Melbourne Declaration aims to enable young Australians to become successful learners, confident and creative individuals, and active and informed citizens).

The objectives of improved individual and national wellbeing (through education) are also reflected in the terms of reference for this inquiry, which suggests that a ‘world-class education system’ is one that ‘equips children to succeed in an increasingly competitive world’ and enables Australia to ‘lift [its] national productivity’.

## **Education outcomes**

Although overarching education objectives are important, the focus of the terms of reference is on developing a national evidence base in order to ‘improve educational outcomes’. The way in which ‘outcomes’ are conceptualised and ultimately, measured, influences the kinds of education data that should be collected, and how such data should be used.

A first consideration is the scope of such outcomes. In the Commission’s interpretation, education outcomes refer to the educational performance and attainment of individual children and young people, as well as of population groups and sub-groups. The Commission proposes that such outcomes would not include all outcomes over the life course (such as employment and earnings after leaving the education system, and other longer-term outcomes). This is not to say that these ‘life outcomes’ are not important, but that they are beyond the scope of this inquiry.

A second issue involves deciding what it means to ‘improve’ education outcomes — whether it is relative to a set of common standards, or with respect to the abilities, strengths and needs of individual children. This has implications for measuring performance and progress. For example, if improving outcomes in literacy and numeracy is taken to mean enabling all children to meet minimum national literacy and numeracy standards, progress may be measured differently than if the goal is to help each child reach their individual potential in literacy and numeracy.

A third question is the extent to which education objectives and outcomes can be ‘operationalised’ — clearly defined and measured in a way that enables some assessment of whether the objectives are being achieved. For example, education objectives in non-cognitive domains such as creativity and interpersonal skills may be seen as just as important as those in traditional academic areas. However, to transform these objectives into practicable measures may require some work in defining the desired skills and knowledge and how these may be measured and assessed in practice.

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## Determinants of education outcomes

A range of factors can interact and shape an individual child's development and learning over the life course (Australian Institute of Family Studies 2009). These factors, or 'determinants', include individual student characteristics (such as innate ability), family and community characteristics (such as socioeconomic background), school or preschool characteristics (such as location and size), and aspects of the broader social and economic contexts (including education policy settings and interventions).

These determinants may be very important in explaining the impact on outcomes for individuals or groups. In seeking to use data to improve education outcomes, it is necessary to both understand and control for what will be defined here as 'external determinants'. External determinants are factors that affect education outcomes that are not directly manageable by the education system (policies, schools and teachers). These may include socioeconomic status (for example, parental education and occupation), Indigenous status, remoteness, and disability. The usefulness of any data source as a means of developing and measuring the effectiveness of 'within-system determinants' (factors within the education system, such as policy interventions) depends substantially on the extent to which the relative contributions of these determinants can be separately identified.

The distinction between objectives, outcomes, determinants and measures is given in box 3.

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### QUESTIONS

- *Does your understanding of the terms 'education data' and 'education evidence base' accord with the definitions presented here? If not, how would you describe these concepts and their relationship?*
  - *Do you agree that the objective of a national education evidence base should be to improve education outcomes? Are there other objectives that should be included?*
  - *What education outcomes do you see as relevant? For example, outcomes in traditional academic domains (such as literacy and numeracy), outcomes in non-cognitive domains (such as communication and interpersonal skills).*
  - *What education outcomes do you see as beyond the scope of this inquiry?*
  - *Can all relevant education outcomes be measured? What approaches can be used in accounting for outcomes that may be difficult to measure?*
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### Box 3      **Objectives, outcomes, measures and determinants**

The inquiry terms of reference mention both ‘national education objectives’ and ‘educational outcomes’, and much of the focus of the inquiry is about how education data can be used as an evidence base to improve outcomes.

To clarify these terms, as used in this inquiry:

- **Objectives** refer to policy or program goals. For example, ‘national education objectives’ are taken to mean the objectives set out in policy documents such as the *Melbourne Declaration on Educational Goals for Young Australians* (Ministerial Council on Education, Employment, Training and Youth Affairs 2008).
- **Outcomes** refer to results achieved in practice. For example, a national education objective might be that all young people become literate and numerate; the relevant outcome in this case would be the literacy and numeracy levels achieved (by a given population group, subgroup or individual).
- **Determinants** refer to the wide range of factors that influence education outcomes. These include both:
  - *within-system determinants*: factors within the education system, such as policy settings, curricula and teaching approaches in schools
  - *external determinants*: factors outside the education system, such as children’s health, family background, socioeconomic status and parents’ educational attainment.
- **Measures** refer to specific indicators of a particular outcome or determinant. For example, a measure of literacy and numeracy attainment might be the score(s) achieved by an individual student, group or population on an assessment such as NAPLAN or PISA. A measure of the home learning environment might be the number of books in the home.

## **Framework for a national education evidence base**

As noted in the terms of reference, a well-structured education evidence base can be useful in identifying what factors might be relevant for improving education outcomes, and enabling rigorous assessment of policy interventions.

The terms of reference indicate that the role of a national evidence base is to ‘improve Australia’s educational outcomes’ through ‘monitor[ing] educational outcomes and inform[ing] policy development and evaluation’. These processes — monitoring progress, evaluating and informing policy and program development — can be represented (at a high level) as a cycle (figure 1). Taken together with the objective of improving education outcomes, this forms a framework that the Commission proposes could be used to guide what data should be collected, and the arrangements for data access and use.

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Figure 1 **A framework for using data to improve education outcomes**



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### Monitoring progress

First, data can be used to track progress against desired individual-level and aggregate outcomes (in accordance with identified education objectives). As noted earlier, a key challenge here is translating these objectives into measures that can be used as a basis for evaluating and comparing progress (Australian Research Alliance for Children & Youth 2008).

Under the Commission’s proposed framework, monitoring progress is an essential first stage in using data to improve outcomes. Without good measures of progress against desired outcomes, there would be little point in trying to assess the effectiveness of policy interventions or school programs.

### Evaluating policies and programs

Second, data can be used to assess the impact, efficiency and effectiveness of particular interventions, programs, treatments or teaching methods. This requires information on education outcomes as well as on the determinants — both within-system and external — that would have contributed to these outcomes.

As highlighted earlier, a key challenge is isolating the impact of specific within-system determinants (such as policy and program design) on a given education outcome, separately from the impact of external determinants. This analytical challenge might require particular methods of data collection and/or analysis, such as randomised

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controlled trials or longitudinal data. Quantitative data might be supplemented with the use of qualitative information, such as through case studies. For example, quantitative data might reveal differences in school-level education outcomes that cannot be explained by external determinants. In that case, further information could be obtained through consultation with individual schools about their programs and methods.

In some cases, the concern might be with identifying the effect of external determinants, not to isolate or remove these effects (analytically), but to assess the need for interventions to be targeted at particular groups that may need additional support.

### Informing decision making

Third, data can be used to inform decisions about the implementation, continuation or cessation of policies, programs or interventions. Many previous studies, both Australian and international, have drawn attention to the importance of ‘data-driven decision making’ in education — of the need for all people and organisations who influence education outcomes to be making decisions grounded in evidence (Mandinach 2012).

A key question here relates to the nature of the decision making that the data are designed to support. For example, data collected to support decision making at a statewide policy level might have different requirements than data collected to support day-to-day decision making at a service delivery level in real time.

Another issue relates to the ways in which data are used. Early consultations with stakeholders suggested that perceptions of the purposes for which data could be used (for example, whether analysis of the data would be used as a basis for funding decisions) can affect the willingness (or otherwise) to provide, share and link data; the quality of data collection; and the publication of data and analysis.

### What data are needed?

The Commission is seeking input from participants about the kinds of data required to support the three processes in the framework proposed above. Such data might include, for example:

- data on education outcomes (for example, student performance data, destination data and data from developmental assessments)
- data on student characteristics sourced from within the education system (for example, data on non-cognitive skills — such as social skills, persistence, creativity, and self-control)
- data on the education workforce (including teachers, principals and support staff) — characteristics and professional development (initial and in-service)

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- data on other education inputs (for example, funding, attendance and available equipment or infrastructure)
  - data on external determinants (for example, cultural background, language and socioeconomic status)
  - other data from outside the education system (for example, health records or social services data).

It would assist the Commission if participants could also specify the kinds of research the data would enable (box 4), and how these research activities would support monitoring progress, evaluating policies or programs, and informing decision making.

#### **Box 4            Examples of education research types**

Descriptive research — research that describes patterns or changes in the data, for example, research that identifies high performing schools

Correlational research — quantitatively studying the relations between variables, for example research that examines the correlation between socioeconomic status and student performance

Experimental research — for example, randomised controlled trials to test the effect of a particular teaching method on student achievement.

### **What data characteristics are desirable?**

The characteristics of data (box 5) can have a direct bearing on its utility and the Commission is seeking feedback on what characteristics are desirable for education data, and the degree to which each of these characteristics should hold. For example, when it comes to comprehensiveness, do the proposed data collection/s need to be a census of the entire population, or is a survey acceptable? When it comes to timeliness, what data should be collected monthly, annually, or every 5 years, for example? To what extent should datasets be consistent in order to facilitate linkage to other data sources?

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## Box 5      **Data characteristics**

The terms of reference for this inquiry nominate several characteristics, including that data are:

- comprehensive — all the relevant data elements are captured in the dataset
- consistent — the data are reliable and uniform as they are collected and applied, with each user seeing a consistent view of the data
- coherent — data from different sources and time periods fit together for the purpose of analysis
- accessible — researchers are easily able to access and share the data
- linkable — the data can be linked to other data sources
- timely — the data are collected frequently enough.

There are also a number of other criteria, for example that the data are:

- accurate — the data values are correct
- granular — data fields are sub-divided to a useful degree
- ethical — data are collected, stored, reported and provided to others in an ethical manner (for example, in a way that protects individuals' privacy and security).

## **What are the associated costs and benefits?**

The benefits arising from nationally collected data, as set out in the terms of reference, are that they enhance the quality and scope of education evidence, and that they can be used to monitor educational outcomes and inform policy development and evaluation. However, improvements to quality and scope are only beneficial to the extent that they enable these developments to occur — over and above what is currently possible. In addition to identifying the new research or capacity that is created by the data, participants should identify the main users of the data (the parties who are likely to undertake the new research or policy activity), and who ultimately benefits (for example, students, parents, teachers, schools or governments).

The costs of collecting, administering and reporting data have the potential to fall on multiple parties including government, schools, students and the wider community. Costs include the full financial cost of any resources used. This includes any direct costs (input costs directly attributable to the activity) and indirect costs (input costs which indirectly support the activity such as overheads) and the opportunity cost of those resources (the cost of forgoing the next best use of those resources). Where full estimates of the cost are not feasible, participants should provide any relevant partial estimates or information that is related to the cost (for example, estimates of the time needed to collect data, or information on whether the data could be collected in conjunction with a pre-existing collection).

Participants should also identify costs and benefits that fall on the broader community. For example, and of particular relevance to this inquiry, are the costs and benefits due to the tradeoff between data accessibility and privacy and disclosure considerations.

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#### QUESTIONS

- *What data should be collected nationally?*
  - *How would these data support the objective of improving educational outcomes?*
  - *What characteristics should the data possess in order to support the processes of monitoring progress, evaluating policies and programs and/or informing policy development?*
  - *Which aspects of administrative datasets are likely to be most useful to inform policy development?*
  - *What additional research or policy activity would be enabled by this data collection?*
  - *Who would use this data and who is the beneficiary of any additional activity?*
  - *What costs are associated with collecting and administering the data?*
  - *What costs and benefits fall on the broader community?*
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### **3 What do we have?**

Australian federal, state and territory, and local governments through various agencies and departments have invested considerable effort in collecting data relating to education. The data collections listed in table 1 are by no means exhaustive.

For instance, the Australian Bureau of Statistics (ABS) is involved in generating data collections such as the National Early Childhood Education and Care Collection (NECECC) and National School Statistics Collection (NSSC). They also collect education data through the Census of Population and Housing and a number of regular education and employment surveys, including Childhood Education and Care Survey, Learning and Work Survey, Survey of Education and Work, and Work Related Training and Adult Learning Survey (Australian Bureau of Statistics 2013a).

In addition to the Programme for International Student Assessment (PISA), students in Australia participate in other international school assessment programs, including Progress in International Reading Literacy Study (PIRLS), Trends in International Mathematics and Science Study (TIMSS), and the International Computer and Information Literacy Study (ICILS) that are designed to assess student achievement in reading, mathematics and science, and computer and information literacy (International Association for the Evaluation of Educational Achievement 2016).

Administrative records from the Commonwealth and jurisdictional departments, including the Department of Human Services — Centrelink and Medicare — contain an abundance of information on individuals capable of forming a powerful longitudinal database. In addition, there are several institutes and research bodies such as, the Australian Institute of Health and Welfare (AIHW), Australian Council for Educational Research (ACER) and

the Australian Institute of Family Studies (AIFS) that are actively involved in collecting data relating to factors that affect education outcomes.

**Table 1 A selection of education and training data collections**

<i>Name</i>	<i>Target group</i>	<i>Indicators and topics</i>	<i>Data custodian<sup>a</sup></i>
National Assessment Program – Literacy and Numeracy (NAPLAN)	Years 3, 5, 7 and 9 students	<ul style="list-style-type: none"> <li>• Literacy (reading, writing and language conventions)</li> <li>• Numeracy</li> </ul>	ACARA, state and territory test administration authorities
National Assessment Program (NAP) sample assessments	Years 6 and 10 students	<ul style="list-style-type: none"> <li>• Civics and citizenship</li> <li>• Information, communication and technology</li> <li>• Science</li> </ul>	ACARA, state and territory test administration authorities
Longitudinal Study of Australian Children (LSAC)	Children aged 0–1 and 4–5 years	<ul style="list-style-type: none"> <li>• Family demographics, relationships, home education, learning environment, risk factors</li> <li>• Educational/care program characteristics</li> <li>• Finances, work, housing, health status</li> <li>• Learning and cognition outcomes, social and emotional development</li> </ul>	DSS
Longitudinal Study of Indigenous Children (LSIC)	Indigenous children 6–18 months and 3.5–5 years	<ul style="list-style-type: none"> <li>• Children — physical and mental health, social and cognitive development, family and community relationships</li> <li>• Children’s families — health, work, lifestyle, family and community relations</li> <li>• Children’s communities — facilities, services, social and community issues</li> <li>• Services — child care, education, health, other</li> </ul>	DSS
Australian Early Development Census (AEDC)	Children in their first year of full time school	<ul style="list-style-type: none"> <li>• Physical health, wellbeing, emotional maturity, social competence</li> <li>• Communication skills, general knowledge, language and cognitive skills</li> </ul>	DET
Longitudinal Survey of Australian Youth (LSAY)	Individuals 15 years and over	<ul style="list-style-type: none"> <li>• Participation, attainment and performance in school, VET and higher education</li> <li>• Employment, job history and seeking activities</li> <li>• Living arrangements, finance and health</li> </ul>	ADA, NCVER
National Early Childhood Education and Care Collection (NECECC)	Census of children enrolled in preschool	<ul style="list-style-type: none"> <li>• Child — preschool hours (available, enrolled, attended), program hours and fees</li> <li>• Service provider — activity type, operation information</li> <li>• Worker — role, qualifications, hours</li> </ul>	ABS, DET, state and territory education departments
National School Statistics Collection (NSSC)	Primary and secondary students	<ul style="list-style-type: none"> <li>• School — type, size of enrolments, affiliation</li> <li>• Student — participation, background, gender, age, school level and grade</li> <li>• Staff — school level, gender, role</li> </ul>	ABS, DET, state and territory education departments, Catholic and independent schools

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**Table 1 A selection of education and training data collections**  
(continued)

<i>Name</i>	<i>Target group</i>	<i>Indicators and topics</i>	<i>Data custodian<sup>a</sup></i>
Programme for International Student Assessment (PISA)	15 year old students	<ul style="list-style-type: none"> <li>• Student assessment — reading, mathematics and science</li> <li>• Student questionnaire — background, attendance, repetition, parental education and occupation, home possessions, pre-primary education, age at school entry, learning time at school (mandatory and additional), out of school learning, domain general non-cognitive outcomes (achievement motivation), domain specific non-cognitive outcomes (beliefs and strategies)</li> <li>• School questionnaire — location, type, size, resources, social/ethnic/academic composition, class sizes, teacher qualifications, school policies, teaching and learning environment</li> </ul>	ACER, DET
The Australian Curriculum, Assessment and Reporting Authority (ACARA) National Data Collection	Students in state and territory government, independent and Catholic schools	<p>Student:</p> <ul style="list-style-type: none"> <li>• Participation — attendance rate and level, participation in NAP assessments</li> <li>• Background — Indigenous status, gender, geographic location, socioeconomic and language background</li> </ul> <p>School:</p> <ul style="list-style-type: none"> <li>• Profile — school type, year range, enrolments, teaching staff, finances</li> <li>• Student outcomes/destination — Secondary School Certificates of Education awarded, VET enrolments and qualifications completed, post-school destination of students</li> </ul>	ACARA
School Teacher Workforce Data	Primary and secondary school teachers	<ul style="list-style-type: none"> <li>• Staff in Australia's Schools Survey — initial teacher education, employment status, job satisfaction, principal authority, teacher appraisal, career paths and intentions</li> <li>• The OECD Teaching and Learning International Survey — learning environment and working conditions</li> <li>• The National Teaching Workforce Dataset — demographics, qualifications, registration status, current employment</li> </ul>	DET

<sup>a</sup> Australian Bureau of Statistics (ABS), The Australian Curriculum, Assessment and Reporting Authority (ACARA), Australian Council for Educational Research (ACER), Australian Data Archive (ADA), Australian Institute of Family Studies (AIFS), Australian Government Department of Education and Training (DET), Australian Government Department of Social Services (DSS), National Centre for Vocational Education Research (NCVER).

*Sources:* ABS (2013b, 2015b); ACARA (2013); ACER (2016); DET (2015, 2016a, 2016b); DSS (2015a, 2015b); Edwards (2012); FaHCSIA (2013); NAP (2016a, 2016b); Nguyen et al. (2010); OECD (2015).

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## 4 Issues and opportunities

The terms of reference ask the Commission to report and make recommendations about factors that inhibit access to, and consistency of, education-relevant data to support analysis and evidence-based policy development. The main considerations discussed in this Issues Paper involve:

- Data sharing (institutional, governance, capacity issues)
- Privacy (confidentiality, data security issues)
- Data comparability across jurisdictions (consistency, definitions and gaps)
- Data capture, processing and management (technological adaptation)
- Technology (scope to improve data collection and dissemination)
- Research capacity (skills, resourcing, infrastructure).

### Data sharing

At the present time, data collected on the early childhood, education and training sectors is fragmented and sector-specific with data collected from (and held by) a variety of sources (table 2). While there is a large amount of data collected, much of it is not currently linked with potential explanatory data held in other collections or in non-education data bases. Institutional and governance arrangements and certain regulatory barriers to accessing data (including issues related to data ‘ownership’) may be factors. Risk aversion by agencies could also be present, based on previous experience in other Commission inquiries. Addressing these effectively will be an important aspect of this inquiry.

Although some initiatives to link education data are underway, the Commission is unaware of any linked research datasets that integrate data sources across the different jurisdictions and education sectors for statistical and research purposes. However, according to the ABS, unit record collections are being (or have been) developed for the two national education data collections – the National Early Childhood Education and Care Collection (NECECC) and National Schools Statistics Collection (NSSC) – and options for data linkage between and within these collections are being (or have been) tested. The associated development and application of uniform standards would also potentially provide nationally comparable statistics (see below).

The ABS’s intention has been to eventually develop an enduring database of education and socio-demographic statistical information constructed from existing data sources to be known as the Australian Longitudinal Learning Database (ALLD). As proposed, the ALLD would be constructed primarily using linkage techniques — making use of variables such as age, sex, geographic location and other socio-demographic characteristics to match records from one dataset to those in another — without identifying individual students (box 6), (National Statistical Service 2012). Other elements of the ALLD were expected to link education data to the ABS Census of Population and Housing and potentially to survey

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data; integrate early childhood education and care, schools and Census data with educational performance measures; link to vocational and higher education data; and integrate datasets from other areas (such as health and community services). However, further progress with the ALLD has stalled.

This development may in part reflect differences in resource capacity of stakeholders (across jurisdictions and across and within school sectors) involved in collecting and holding education data. In addition, the multiplicity of data custodians and ethics committees; complexities of retaining data over long time periods; privacy and legislative constraints; requirements for making data available to external researchers; and differences in data linkage capabilities between jurisdictions represent significant challenges to linkage programs (Australian Institute of Health and Welfare 2014, p. 25). Current requirements for accessing selected jurisdictional datasets are summarised in table 2.

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**Box 6            Data linkage methods used to protect privacy**

There are two main methods used to link datasets in a way that protects the identity of individuals — deterministic and probabilistic linkage.

Deterministic linkage involves exact matching of information to identify records in different datasets that refer to the same person. In its simplest form, it uses a unique identifier such as a tax file number to link records (National Statistical Service 2016a). The Government has introduced a Unique Student Identifier for VET students, which could be used for deterministic linking (Fowler 2016).

Probabilistic linkage combines records in different datasets that have the greatest probability of referring to the same person. Rather than a unique identifier, it uses a combination of identifiers such as name and address to identify and evaluate links (National Statistical Service 2016b).

Both deterministic and probabilistic linkage methods have been used recently in projects linking education data.

*Source(s):* (Fowler 2016; National Statistical Service 2016a, 2016b)

**Table 2 Selected data access requirements by jurisdiction<sup>a</sup>**

<i>Pre-school data</i> <sup>b</sup>	<i>NSW</i>	<i>Vic</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>
<b>Mandatory requirements</b>								
Review by Human Research Ethics Committee								
Request for data to data custodian	✓	✓	✓	✓	✓	✓	✓	✓
Data custodian approval (in-principle)	✓	✓	✓	✓	✓	✓	✓	✓
Contract or MoU required	*	✓	✓	*	✓	✓	*	✓
Data held by jurisdictional linkage unit								
Brokerage available by linkage unit								
<i>Perinatal data</i>								
<b>Mandatory requirements</b>								
Review by Human Research Ethics Committee	✓	✓	✓	✓	✓	✓	✓	✓
Request for data to data custodian	✓	✓	✓	✓	✓	✓	✓	✓
Data custodian approval (in-principle)	✓	✓	✓	✓	✓	✓	✓	✓
Contract or MoU required	✓	*	*	*	*	*	*	*
Data held by jurisdictional linkage unit	✓	✓	✓	✓	✓	✓	✓	✓
Brokerage available by linkage unit	✓			✓	✓			✓
<i>Births data</i>								
<b>Mandatory requirements</b>								
Review by Human Research Ethics Committee	✓	✓	✓	✓	✓	✓	✓	✓
Request for data to data custodian	✓	✓	✓	✓	✓	✓	✓	✓
Data custodian approval (in-principle)	✓	✓	✓	✓	✓	✓	✓	✓
Contract or MoU required	✓	*	*	*	*	*	*	*
Data held by jurisdictional linkage unit	✓	✓	✓	✓	✓	✓	✓	✓
Brokerage available by linkage unit	✓			✓	✓			✓

<sup>a</sup> ✓ Denotes that this is a requirement for the state and territory. \* Denotes that requirement for an MoU or contract yet to be determined. <sup>b</sup> There is also a requirement that approval be provided by senior delegates in each jurisdiction for pre-school data.

Sources: (Australian Institute of Health and Welfare 2014, p. 28)

In recognition of these prospective challenges, the Commonwealth and state and territory governments have agreed to frameworks to promote inter-jurisdictional cooperation for the development of individual components of the education evidence base. The cooperative approach was based around agreed rules regarding collection, compilation, interpretation, reporting and sharing of national information (Ministerial Council for Education, Early Childhood Development and Youth Affairs 2010).

However, as mentioned above there are indications that these frameworks have not delivered on their intended goal. The AIHW (Australian Institute of Health and Welfare

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2014) has documented many of the difficulties it has met in developing a research dataset of early childhood development (which plans to link birth, perinatal, pre-school, AEDC and NAPLAN data). While education data linkage programs have proved problematic, there has been substantial progress in linking data in other fields for research purposes (box 7).

**Box 7                      Data linkage initiatives in health research**

In health research, the Western Australian Data Linkage system has been in operation for more than 30 years and employs probabilistic linkage techniques on de-identified health data. It has an established system of governance across collection agencies, data custodians and researchers. The linking of data is conducted by an independent data linkage unit with researchers developing projects in consultation with data custodians and then seeking approval from a dedicated ethics committee (Stanley 2010).

Building on that system, the Public Health Research Network (PHRN) was established in 2009 as a national cooperative network of data linkage infrastructure enabling access to linked health and related data to approved researchers. The PHRN involves a network of data linkage units in each state and territory; national linkage units to perform cross-jurisdictional linkage; secure remote access and file transfer infrastructure; and a national coordinating office (Population Health Research Network 2011). The Australian Government provides the funding through the National Collaborative Research Infrastructure Strategy program while research institutes provide cash and in-kind contributions.

*Source(s):* (Population Health Research Network 2011; Stanley 2010)

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## QUESTIONS

- *Which datasets (from the both education and non-education sectors) would be of highest priority to include in the development of an enduring educational database? What are the existing and prospective barriers to the facilitation of data linkage in education data?*
  - *What are the main challenges and impediments to implementing data linkage in the education sector? Are these challenges and impediments different from other sectors? If yes, how?*
  - *Have the frameworks developed to improve cooperation in education data linkage been effective in delivering essential, accurate, reliable, timely and nationally consistent education information? If not, why?*
  - *How could governance and/or institutional arrangements impacting on data collection and access be streamlined or otherwise improved to enable better cooperation among stakeholders for the delivery of education information?*
  - *Would the Australian Longitudinal Learning Database deliver the type of research dataset that contemporary education researchers and policy makers need?*
  - *What lessons can be learnt from previous data linkage efforts, in the education and other sectors (e.g. health care, social services) and from other countries?*
  - *Are there other models for developing an enduring, linked education database? How would the costs and benefits of these models compare to the ALLD?*
  - *What are the relative advantages and disadvantages of using probabilistic or deterministic linkage techniques to link datasets?*
  - *What are the costs and benefits of expanding the Unique Student Identifier nationally to students in school and early childhood education and care?*
- 

## Privacy

Protecting the privacy of individuals and the confidentiality of information obtained from those individuals is an important overarching consideration in allowing access to education (or other) data by third party researchers and policy makers. Privacy protection serves to promote trust and confidence by individuals (and organisations) that personal information is collected, stored and used in an appropriate manner.

The *Privacy Act (Cwth) 1988*, regulates the handling of personal information by government agencies and other organisations and covers the collection, storage, security, use, disclosure and destruction of personal information. The provisions contained in the Privacy Act are in addition to commitments made under various legislation governing particular policy areas that collect personal information.

For example, the *Census and Statistics Act 1905* (sect 12) prohibits the ABS from the publication or dissemination of statistical information which would enable identification of

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a particular person. The AIHW is similarly governed by confidentiality provisions (under the *Australian Institute of Health and Welfare Act 1987*) that prohibit the release of information concerning a person other than in accordance with the Act. These provisions are broader than those contained in the *Commonwealth Privacy Act 1988*.

In addition to privacy legislation at the Australian Government level, six of the eight states and territories have their own privacy legislation (the exceptions are Western Australia and South Australia). These laws prohibit the provision of information to third parties without the express consent of parents or guardians. While consent needs to be obtained during the data collection phase there is no uniform application of this requirement across jurisdictions. This has restricted the ability of some jurisdictions to provide education information to agencies attempting to build research education datasets.

A related issue involves limits placed on the potential use of data by the specific legislation that gives effect to a program. An example given to the Commission was that of higher education funding where the relevant legislation restricts the use of data collections in this area to higher education purposes only. In situations where the relevant legislation is either silent on allowable uses of collected data or open to interpretation, there is a likelihood of program administrators adopting a risk-averse approach to data access by third parties.

Together, such requirements restrict access to education data and mean that alternative approaches to enable data linkage need to be developed and employed (see above). Examples include the use of specific statistical techniques to de-identify unit record data and (potentially) the introduction of unique student identifiers. These alternatives may involve associated loss of information and additional data processing costs. Importantly, in the health and medical research sphere there is a waiver under the *Privacy Act 1988* which permits access to health data collections without the need to obtain an individual's consent (Australian Institute of Health and Welfare 2014, p. 23; Stanley 2010).

More broadly, the granting (or presumption) of individual (or parental) consent raises questions about who 'owns' the resulting education data and how that data can be shared and used once consent has been established. In those circumstances where education data has been aggregated (and privacy concerns met), data ownership and sharing questions should, in principle, be less problematic. To the extent there is residual uncertainty, the creation of an effective national framework may need to propose revisions to regulation.

At the individual research project level, separate approval requirements across jurisdictions for researchers wishing to conduct cross-jurisdictional studies can increase compliance costs and result in unnecessary delays. In this context, researchers seeking government school data must obtain permission from each state and territory education department. Each jurisdiction in Australia assesses applications separately, though according to broadly similar criteria (Australian Association for Research in Education 2016). State and territory education departments have agreed to trial a process whereby researchers wishing to undertake research in more than one jurisdiction apply to each jurisdiction separately, but using a single national application form. Applications will be assessed by each jurisdiction

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according to their research approval guidelines (Australian Association for Research in Education 2016).

Another issue involves the adverse incentives faced by policy agencies who are also responsible for data custody to provide access to education data that may be politically sensitive. In this context, policy departments may be reluctant to provide data for independent research that could yield unfavourable public findings about program effectiveness. Related to this is a concern that the release of raw data may lead to its misinterpretation or misuse (Productivity Commission 2013, p. 12).

Data custodians may also restrict the *way* in which researchers access data, for example by only allowing access from a supervised physical location. The ABS restricts access to some of its unit record level (URL) data to the ABS Data Laboratory, which is accessed from a secure location within ABS premises. To ensure confidentiality, the ABS vets all outputs from the Data Laboratory (Australian Bureau of Statistics 2015a). The ABS has launched a pilot Virtual Microdata Laboratory — which allows remote access to the ABS Data Laboratory — at the Department of Social Services and the Productivity Commission. It plans to expand access to the Virtual Microdata Laboratory to other government agencies and possibly research institutes (ABS 2016). The development of remote working solutions has been identified as an important growth area for research on government data (Desai et al 2016).

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## QUESTIONS

- *Do legislative provisions governing privacy and confidentiality of education data unnecessarily delay or otherwise limit the ability to draw effectively on that data?*
  - *If yes, is the delay caused by the legislation itself or by the flexibility it provides to data custodians and other stakeholders through interpretation?*
  - *Can these legislative provisions be modified in a way that better balances confidentiality with utility? If yes, how?*
  - *What are the costs and benefits of using unique student identifiers to address this?*
  - *In what circumstances should consent be required from individuals regarding the provision and linkage of data concerning them?*
  - *Are there issues surrounding the ownership of education data particularly with respect to aggregate data?*
  - *How can access arrangements to education data be otherwise improved, to ensure data can be used effectively by governments, researchers, parents, schools and teachers?*
  - *Are there opportunities to streamline access arrangements through mutual recognition (between data-custodian organisations) of processes for vetting users? For example, mutual recognition of 'trusted users'.*
  - *Do data access arrangements adequately allow for the checking or duplication of research?*
  - *What lessons can be learned from data access arrangements in non-education sectors and in other countries?*
  - *Are there opportunities to increase consent rates by changing the way in which participants provide consent? For example, by moving to an 'opt-out' model.*
  - *Would a consent waiver for data used in education research (similar to that available for health and medical research) introduce new risks to privacy? Are such risks manageable?*
  - *How can data custodians take advantage of technological advances in remote access to secure data systems, such as the ABS Data Laboratory?*
- 

## Data comparability

At a national level, the collection of education statistics at the early childhood, school and post-secondary education level is governed by data standards and instructions that are intended to improve the comparability and quality of data across jurisdictions. Although substantial improvements have been made (in terms of concepts, methods and definitions used) since the introduction of these data standards there are ongoing concerns about the comparability of the associated education datasets across jurisdictions (Deloitte Access Economics 2015). In many instances the comparability issues reflect the different service

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models and data collection methodologies used in individual states and territories and by the Australian Government.

By way of example, each jurisdiction operates different models of preschool service delivery with the distribution of preschools between government and non-government providers differing markedly across states and territories. Moreover, the responsibility for data collection is split between the Australian Government which utilises the Child Care Management System (CCMS) for non-government pre-school provided in a child care setting and the states and territories. Importantly, not all jurisdictions currently collect data at the unit record level which poses a significant barrier to data linkage initiatives (see above). This is also true of data collected under the CCMS (Australian Institute of Health and Welfare 2014, p. 21).

There are also significant variations in the way states and territories and the Australian Government obtain data for the early childhood collection and in formal definitions of preschool age. Some jurisdictions capture only four year olds while other jurisdictions include three year olds that meet certain calendar cut-off dates for enrolment (Deloitte Access Economics 2015). Although national consistency of education data is not likely to be a concern for individual states and territories, the lack of comparable data limits the capacity to undertake research at the national level including comparisons of different service models to benchmark which delivers the most effective and efficient outcomes.

In addition to jurisdictional comparability issues, educational research and policy development is also constrained by differences in the definitions, coding of data items and the existence of data gaps *within* the main education data collections and *between* education data collections and those from other sectors including health and community services. A recent mapping exercise conducted by the Australian Institute of Health and Welfare (AIHW) sought to review, among other things, the consistency and alignment of education data items with existing nationally endorsed standards, including the identification of data gaps.

The review found that about 25 per cent of education data items currently collected were fully consistent with endorsed national data standards (Australian Institute of Health and Welfare 2015, p. 9). Moreover, about 6 of 11 education data collections were assessed to have the core and supplementary linkage items required to enable data linkage with other datasets. Based on the mapping exercise and consultations with data custodians, the review identified data on educational institutions (including type and historical attendance), enrolment status and attendance as priority areas for further development (Australian Institute of Health and Welfare 2015, p. 16).

There are also differences in the way data on primary and secondary school students is collected and provided to third parties. The National Schools Statistics Collection (NSSC) is a census of administrative datasets maintained by state and territory education departments and collated by the ABS that aims to provide nationally comparable data on schools. Currently, however, only Tasmania provides student-level data for the production of ABS statistics, although other jurisdictions collect data at this level and some have

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commenced providing student-level data for quality assurance purposes (Australian Bureau of Statistics 2015c). The advantages of utilising student-level data include: improving the quality of data used for NSSC outputs; reducing provider burden in data provision, validation and reconciliation processes; and supporting improved outputs from the NSSC, for instance by providing better measures of retention and progression.

A rolling program of data standards review is underway for most educational data collections (the main exception being the NSSC which is discussed below). However, substantial differences in the timeframes for these reviews means that collection-specific (as opposed to universal) approaches to amend and/or implement any changes are required. Also, given that many collections involve multiple stakeholders and data custodians this complicates the consideration and implementation of any changes to data standards (Australian Institute of Health and Welfare 2015, p. 26).

The collection of data that are not useful for research and evaluation, and not needed for other purposes, imposes a reporting cost on providers (and may generate other costs) without an associated benefit. By way of example, in its review into the Contribution of the Not-for-Profit Sector, the Commission found that agencies collected large amounts of data from service providers, much of which was not used (Productivity Commission 2010, cited in PC 2012-13 annual report). Also as both data and data needs change over time, reviews of data collection are necessary to avoid the ongoing collection of redundant data. For example, in relation to the Longitudinal Study of Indigenous Children (section 3), Western et al. (2014, p. 23) point out that because of the study's small sample size, respondent drop-out can quickly lead to a sample size that is no longer of value to policymakers. Duplication in data collection also generates costs and may be avoidable, including through linkage of datasets.

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## QUESTIONS

- *What are the comparability issues in the national education and training data collections?*
  - *Are these comparability issues significant? If yes, how can they be improved in the most cost-effective manner?*
  - *How could education data quality and consistency be improved, either through modifications to existing processes or via new approaches?*
  - *Are there instances of data providers being required to collect or provide the same data at different times?*
  - *Are there instances of duplication in data collection that could be addressed to: a) ease the compliance burden on collection bodies? b) ease the compliance burden on data providers (such as students, parents and schools)?*
  - *Are there areas of current investment in the creation of education data or evidence that do not provide value in meeting the objectives?*
  - *Which administrative records created in the delivery of schooling or early childhood education and care (for example, maternal and child health records) that would add value to the national education evidence base, have not yet been turned into usable datasets?*
  - *What instances are there of schools being required to provide administrative information to government that do not add value to the education evidence base?*
- 

## Data capture, processing and management

Data creation, processing and management involve a variety of activities that generally occur prior to data being analysed or used. These activities include data collection, translation, validation, encryption, storage and management (UK Data Archive 2016). Depending on the type of data, the nature of these functions varies between datasets. Nonetheless, the way in which data are created and processed affects the characteristics of data (in terms of consistency and coherence); the benefits it provides to users; and its associated costs.

Part of the burden of data creation falls on students participating in surveys and standardised tests through the stress imposed by participation and the excess compliance cost of duplicating personal information that is already available. In a study of five Australian school communities, Wyn et al. (2014, p. 6) found that most students reported feeling some stress associated with NAPLAN tests, and a smaller number experienced anxiety and ‘stress related conditions’ such as hyperventilation, profuse sweating and headaches. Using more everyday language in the test may reduce the stress burden on students (Wyn, Turnbull & Grimshaw 2014, p. 6). Different strategies could reduce the burden on students participating in surveys. For example, linking survey datasets to the

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census could remove the need for survey participants to provide socio-demographic information.

Data custodians are currently limited by the nature of the systems used to collect and manipulate data. Where these systems have been designed for administrative purposes, extracting data in a form suitable for education research may be problematic. Specific research data may be missing, inaccurate or inconsistent, time series data unavailable and documentation non-existent. A related issue is whether data custodians currently have the resources to transform existing data assets into research datasets and to provide follow-up support to researchers (see below).

Moving toward online platforms is expected to have a marked impact on the time taken to collect, distribute and analyse education data. Currently, there are several initiatives underway that will affect the way education datasets are created, processed and used by researchers and policy makers. For example, NAPLAN assessments will move online in 2017 allowing for tailored test design and providing teachers and schools with more targeted and detailed information on student performance. The Program for International Assessment (PISA) is also in the process moving to an online platform. Progress in moving administrative datasets to online platforms is less developed.

Randomised controlled trials (traditionally used in medical research) are a recent innovation in the evaluation of education policies and programs (see box 2). They have been embraced internationally with the United Kingdom Education Department funding dozens of randomised control trials in schools and combining the results with other research outputs to produce an online Teaching and Learning Toolkit (Education Endowment Foundation 2016). A similar Teaching and Learning Toolkit has recently been launched in Australia (ATLT 2016).

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## QUESTIONS

- *How could the creation and processing of national education data be improved to reduce system administrative or financial costs and better meet education objectives?*
  - *Do data custodians have sufficient resources to transform existing data assets into research datasets?*
  - *Is a fear of exposing program failure a serious impediment to data development and use? What can be done to overcome this?*
  - *What are the main barriers to the automated movement of data between organisations (for example, between schools and governments)?*
  - *What opportunities are there to use real-time data collection (for example, of student attendance) to improve the quality of data collected and/or the timeliness with which it is available?*
  - *What characteristics of education data restrict or enhance the scope for using randomised controlled trials to create evidence about the effectiveness of education policies and programs in Australia?*
  - *What lessons can be learned from other countries, or other sectors within Australia, about effective and efficient data collection and processing?*
- 

## Technology

The increasing availability and use of technology can have a pervasive influence on the quality, timeliness and cost of data collection, processing and its use. As well as enabling improvements in service delivery, technology also facilitates greater access to information for education researchers, policy makers, teachers and parents. Technology also facilitates the generation of datasets which are more suited to research purposes. As noted earlier, an example of recent or prospective technological innovation involves the move to NAPLAN online which will involve electronic completion of NAPLAN tests and potentially result in significant reductions in the time it takes to provide feedback to schools, students and parents.

However, the rate of technological adoption has been constrained by variations in the resource capacity of schools across and within education sectors. In particular, non-government schools in small remote communities face significant barriers in terms of the costs of data management software as well as access to broadband internet connections. These issues are particularly relevant to the independent school sector which is characterised by a wider diversity of school types compared with government and Catholic-system schools. Independent schools in small remote communities (specifically Queensland, Western Australia and the Northern Territory) are more likely to experience technology barriers than their metropolitan counterparts.

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#### QUESTIONS

- *What are the main barriers to the greater adoption of technology (including mobile devices) to improve the quality and/or timeliness of data collection, processing and use?*
  - *How can these barriers be best overcome?*
  - *Should the Australian Government play a greater role in supporting technology adoption in resource constrained schools? Or should this be pursued collectively amongst State and Territory jurisdictions?*
  - *What form should that support take?*
  - *What new or alternative technologies could be utilised to improve the quality, timeliness and cost of data collection, processing and its use?*
- 

### **Analytical and research capability**

Translating the national education evidence base into the objectives discussed in section 2 requires sufficient analytical and research capabilities among researchers, government policy departments, schools, teachers and parents. The Commission is seeking input on where these capabilities (including in which school sectors and in which jurisdictional locations) could be improved and, if so, the role for governments in building these capabilities.

State and territory education departments currently have varying degrees of involvement in building research capacity. The Victorian Department of Education and Training has a research partnership with the Melbourne Institute of Applied Economic and Social Research, and provides the principal funding for the Institute's Economics of Education and Child Development Research Program (Melbourne Institute 2012; Victorian Department of Education and Training 2016). The NSW Department of Education: 'engages in major education research projects by initiating, undertaking, managing, and/or acting as partner in major research projects of statewide, national and international significance' (Australian National University 2016).

In 2012, the NSW Government created the Centre for Education Statistics and Evaluation (CESE) to improve the effectiveness, efficiency and accountability of education in New South Wales (Centre for Education Statistics and Evaluation 2016). CESE's three main responsibilities are to:

- provide data analysis, information and evaluation that improve effectiveness, efficiency and accountability
- create a one-stop shop for information needs – a single access point to education data that has appropriate safeguards to protect data confidentiality and integrity

- 
- build capacity across the whole education sector by developing intelligent tools to make complex data easy to use and understand, and providing accessible reports so that everyone can make better use of data (Centre for Education Statistics and Evaluation 2016).

The *My School* website provides tools to help parents, teachers and schools analyse NAPLAN results. Information on student progress provides a measure of the value schools have added to their students' learning over the two years between NAPLAN assessments. *My School* also allows comparisons of NAPLAN results and progress with other schools with statistically similar students (ACARA 2015). The NSW Government has introduced the School Measurement, Assessment and Reporting Toolkit (SMART) system to help teachers and schools analyse results from NAPLAN (and from the NSW-wide Essential Secondary Science Assessment) (NSW Government 2014).

In addition to NAPLAN results, *My School* provides a range of other data to inform parents and encourage engagement with their children's schools (Australian Curriculum Assessment and Reporting Authority 2015b). This includes data on students' backgrounds (such as the proportion of students from a non-English language background), school finances and student attendance (Australian Curriculum Assessment and Reporting Authority 2015a).

The bulk of education research activity occurs through university research. In 2012, universities spent about \$350 million on education research (Australian Bureau of Statistics 2014). University research is supported by two major funding sources: 'general university funds', including student fees, and competitive grants and research block grants funded by the Australian Government (box 8). In 2012, the Australian Research Council — which administers competitive grants in non-medical fields of research — provided competitive grants worth \$25 million to education research projects (Australian Research Council 2015).

#### **Box 8 Major funding sources for university research**

University research is supported by two major funding sources:

- 'General university funds', including international student fees and income from Australian students (both fees, and funds from the Commonwealth Grant Scheme, through which the Government provides funding for many Australian students). In 2012, general university funds accounted for 55 per cent of total spending on research.
- Australian Government funding for university research delivered through the dual funding system of competitive grants and research block grants. Competitive grants fund only the direct costs of individual research projects. Research block grants are not tied to specific projects, allowing universities to make strategic decisions on their research investments. In 2012, competitive grants accounted for 17 per cent of total spending on research and research block grants accounted for 15 per cent.

*Source:* (Australian Department of Education and Training 2015, pp. 10–12).

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#### QUESTIONS

- *How do parents use the data provided on My School?*
  - *How has My School affected parents' engagement with schools?*
  - *What are the most effective ways of enhancing the capabilities of parents, schools and teachers to use the education evidence base to improve student outcomes?*
  - *How effective have the different jurisdictional approaches to facilitating education research been in building research capacity?*
  - *What lessons have been learned from their introduction?*
  - *Does one model stand out as a model for other jurisdictions to adopt?*
- 

## **5 Institutions, data governance and prioritising reform**

The discussion thus far has focused on potential changes in what and how data might be collected in order to improve the national education evidence base. This section seeks information about whether the institutional and governance arrangements for the national education evidence base might be improved.

Institutional and governance arrangements are a key element to successful development and use of an evidence base (section 4). For example, they affect (and are affected by) the business operations of the institutions that gather data in the course of providing services. The costs faced by those institutions are a function of the types of data they are asked to gather and the systems in which they need to invest. Higher costs create business pressures, and potentially affect the quality of gathered data. The arrangements also affect (and are affected by) the relationships between different parties to the arrangements (students, parents, teachers, schools and jurisdictions). The better the concerns of any party are addressed, and the clearer the benefit to them of the national education evidence base, the more likely they will be to engage in any collection and sharing of data.

This section seeks participants views about the nature of the institutions and their governance arrangements, and whether they are impeding the sharing of data and effective and efficient provision. Participants are encouraged to identify priority areas so that resources and effort can be directed towards those that are likely to be the most beneficial.

### **What data governance arrangements might work best?**

Institutions and their governance arrangements encompasses the institutions that are responsible and accountable for data (data owners and custodians), the policies and processes associated with the operations of those institutions (for example, what and how

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data are gathered, and privacy and disclosure requirements) and the associated physical infrastructure (such as information technology systems and other support systems).

Legislative instruments covering the operations of different institutions can facilitate or hinder the development and use of an evidence base. For example, protocols around data collection developed some time ago — prior to the ability to use algorithms to discover unobserved patterns in Big Data — may limit the way data are used today (and in the future), even though there might be clear value to the Australian community in those uses. Protocols (or the application of those protocols) around access have the potential to foster or stymie the development of evidence. They can contribute to or mask transparency around the effectiveness and efficiency of service delivery and the accountability of service providers. Where protocols have not been updated in the past decade, it is probable that major advances in data analytical capability are not being recognised.

Legislative instruments also play a key role in ownership of data. Ownership determines, for example, who is able to create and modify data, and how access may be shared or restricted.

Australia's current institutional arrangements governing education data are complex. A range of institutions (at the state and federal level, and including government schools, non-government schools and preschools) are responsible for the collection, administration and reporting of education data. Policy making institutions shape the data landscape through setting governance arrangements, establishing organisational and legislative objectives, and establishing a range of inter-jurisdictional agreements (section 2) and other arrangements that govern collection, provision and reporting.

The Commission is seeking views on the best way to structure a contemporary institutional environment, in relation to the education evidence base, including whether new institutions are needed and ways in which current arrangements might be improved.

Participants are also invited to provide advice on possible improvements to other governance arrangements including:

- measures that would improve institutional accountability, transparency and integrity
- procedural improvements that might be made by data custodians (including improvements to the requirements for data access)
- improvements to the underpinning agreements, arrangements (including funding arrangements) and legislation
- improvements in technological capacity.

Examples of best practice drawn from domestic or international experience are welcome.

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#### QUESTIONS

- *What institutions should be assigned responsibility for, and be held accountable for, the different aspects of the national education data resource? Are new institutions needed?*
  - *Are there too many institutions responsible for Australia's education data? If so, how should they be rationalised?*
  - *Are there areas of overlap or duplication in data collection and provision in Australia? What costs arise as a result? How might these overlaps, and areas of duplication best and most cost-effectively be addressed?*
  - *Are improvements to transparency or oversight required?*
  - *Are data custodians held accountable for the quality and availability of data? Are data access requirements no more burdensome than necessary?*
  - *Have data access protocols been updated to recognise advances in Big Data analytics? If not, is this a priority?*
  - *Are there other procedural improvements that data custodians could make?*
  - *In the event of conflict between data users and data managers are there effective dispute resolution mechanisms?*
  - *Are improvements to underpinning agreements, arrangements (including funding arrangements) and legislation required?*
  - *Could governance be improved through better utilisation of technological innovations?*
  - *Which jurisdictions or nations have best practice jurisdictional and governance arrangements?*
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### **Assessing costs and benefits to prioritise reform**

As government resources are scarce and the provision of evidence bases are typically costly, it is important that changes to the national education data resource be prioritised. Reforms should be prioritised to those areas that offer the largest potential net benefits (benefits minus cost) to the Australian community as a whole.

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#### QUESTIONS

- *What reforms are likely to be the most beneficial?*
  - *How should reform options be prioritised?*
  - *How long would these reforms take to implement?*
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## Attachment A — How to make a submission

### How to make a submission

This Commission invites interested people and organisations to make a written submission.

Each submission, except for any information supplied in confidence (see below), will be published on the Commission's website shortly after receipt, and will remain there indefinitely as a public document. The Commission reserves the right to not publish material on its website that is offensive, potentially defamatory, or clearly out of scope for the inquiry or study in question.

When providing a submission to the Commission, you may wish to remain anonymous or use a pseudonym. Please note that, if you choose to remain anonymous or use a pseudonym, the Commission may place less weight on your submission.

Copyright in submissions sent to the Commission resides with the author(s), not with the Commission. Submitters should ensure that they hold copyright in any submitted documents, or that the copyright holder has authorised the publication of any relevant documents on the Commission's website.

### How to prepare a submission

Submissions may range from a short letter outlining your views on a particular topic to a much more substantial document covering a range of issues. Where possible, you should provide evidence, such as relevant data and documentation, to support your views.

This is a public review and all submissions should be provided as public documents that can be placed on the Commission's website for others to read and comment on. However, information which is of a confidential nature or which is submitted in confidence can be treated as such by the Commission, provided the cause for such treatment is shown. The Commission may also request a non-confidential summary of the confidential material it is given, or the reasons why a summary cannot be provided. You are encouraged to contact the Commission for further information and advice before submitting such material. Material supplied in confidence should be provided under separate cover and clearly marked 'IN CONFIDENCE'.

### How to lodge a submission

Each submission should be accompanied by a submission cover sheet. The submission cover sheet is available on the inquiry web page. For submissions received from individuals, all **personal** details (for example, home and email address, signatures, phone,

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mobile and fax numbers) will be removed before they are published on the website for privacy reasons.

The Commission prefers to receive submissions as a Microsoft Word (.docx) files. PDF files are acceptable if produced from a Word document or similar text based software. You may wish to research the Internet on how to make your documents more accessible or for the more technical, follow advice from Web Content Accessibility Guidelines (WCAG) 2.0 [www.w3.org/TR/WCAG20/](http://www.w3.org/TR/WCAG20/).

Do not send password protected files. Do not send us material for which you are not the copyright owner — such as newspaper articles — you should just reference or link to this material in your submission.

Track changes, editing marks, hidden text and internal links should be removed from submissions before sending to the Commission. To ensure hyperlinks work in your submission, the Commission recommends that you type the full web address (e.g. [www.referred-website.com/folder/file-name.html](http://www.referred-website.com/folder/file-name.html)).

Submissions sent by email must not exceed 20 megabytes in size as our email system cannot accept anything larger. If your submission is greater than 20 mb in size, please contact the Administrative Officer for the relevant project to organise another method of sending your submission to the Commission.

Submissions can be accepted by email or post:

Email*	<a href="mailto:education.evidence@pc.gov.au">education.evidence@pc.gov.au</a>
Post	National Education Evidence Base Productivity Commission Locked Bag 2, Collins St East PO Melbourne VIC 8003

\* If you do not receive notification of receipt of an email message you have sent to the Commission within two working days of sending, please contact the Administrative Officer.

Due date for submissions

Please send submissions to the Commission by **25 May 2016**.