Nulungu
Research Institute
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Developing a Culturally Appropriate Data Quality Framework for Aboriginal and Torres Strait Islander Higher Education Statistics

Discussion Paper
May 2015

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Artwork: '**Seeing Country**' by Nyaparu Laurel

Nyapuru Laurel was a Walmajarri artist and educator from the Kadjina Community in the Kimberley region of Western Australia on the edge of the Great Sandy Desert – part of Millijidee Station. Along with her sisters, brothers and mothers, Nyapuru advocated to set up the remote Wulungarra Community School and through her work, contributed to the passing on of knowledge of the land, law and culture to future generations. She passed away in August, 2015.

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Data Quality Issues in Aboriginal and Torres Strait Islander Higher Education Statistics

Neil Drew, Judith Wilks, Katie Wilson[1]

He uses statistics as a drunken man uses lamp posts - for support rather than illumination.

Andrew Lang

Not everything that can be counted counts, and not everything that counts can be counted.

Albert Einstein (attributed)

Facts are stubborn things, but statistics are more pliable.

Mark Twain

If you torture the data long enough it will confess.

Ronald Coase

[1] The research team comprises Indigenous and non-Indigenous researchers who collaborated in earlier OLT funded research during 2011-13: *'Can't be what you can't see': The transition of Aboriginal and Torres Strait Islander students into higher education* (Kinnane, Wilks, Wilson, Hughes, & Thomas, 2014). This project provided the impetus for the current research. In the process of developing a statistical profile of Aboriginal and Torres Strait Islander students and population sub-groups we encountered several inconsistencies in data collection, and anomalies in the availability and presentation of statistics, prompting us propose this new area of enquiry.

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Introduction

Statistics can be very persuasive yet are arguably one of the least understood of all contributions to debates of national importance. A curious paradox exists wherein many people deride statistics seemingly at every opportunity yet allow themselves to be persuaded by them. Psychologists call this form of behaviour "confirmation bias". DeMaria (2008) clearly stated: "I must confess to always having viewed studying statistics as similar to a screening colonoscopy; I knew that it was important and good for me, but there was little that was pleasant or fun about it" (p.1430).

Equally concerning is that statistics are often poorly understood by the very interests that invoke them, regardless of whether they are invoked in good faith, or for the purpose of obfuscation or some other deceptive or manipulative intent. British Prime Minister Benjamin Disraeli's oft-quoted statement that there are "lies, damned lies and statistics" is not without reason2. Since the advent of the abacus, statistics have been used to persuade; and they are easily manipulated. Governments and politicians have form when it comes to (ab)using statistics to demonstrate the need for, and success of, policy initiatives. Statistics enhance compliance (Broadbent, 2004). The selective use of numbers is alluring but can often be misleading or illusory, an artefact of our general statistical ignorance and perhaps of our willingness to defer to authority.

Nonetheless, statistics are crucial to our understanding of complex issues. This presents a dilemma, namely—we can't do without data and statistics yet we are poorly equipped to manage both their use and their consumption.

In the Australian Aboriginal and Torres Strait Islander cultural context, the use (and abuse) of data and statistics present other layers of significant complexity. Researchers (for

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[2] Attributed to Disraeli by Mark Twain but not verified in any of Disraeli's writing thus often attributed to Twain.

example, Rowse, 2009; J. Taylor, 2011; Walter, 2010) have interrogated motivations, "social interests" (Watts, 2003 cited in Rowse, 2009, p. 195) and practices associated with collecting data about Aboriginal and Torres Strait Islander peoples within non-Indigenous frameworks in Australia. Walter (2010), for example, cites recent policies and projects such as the Council of Australian Governments (COAG) Closing the Gap in which, she argued, statistics are deployed for the purposes of "fixing the Indigenous problem" (p. 50).

Attempting to "count" Aboriginal and Torres Strait Islander peoples is a surprisingly recent enterprise. According to the 1901 Australian Constitution, Aboriginal and Torres Strait Islander peoples were counted but were excluded from the census (Martin, Morphy, Sanders, & Taylor, 2004). It was only after the 1967 referendum that an Aboriginal Enumeration Strategy was developed by the Australian Bureau of Statistics (ABS) (see also Australian Institute of Health and Welfare & Australian Bureau of Statistics, 2006). This led to the development of an Indigenous self-identification question, and the shift from biological to sociological determinants for enumerating the "Aboriginal population" (Rowse & Smith, 2010, p. 90). The exclusion of Aboriginal people from the census was not an apolitical act; it was an "active colonial practice", and the "uncounted counting" was emblematic of the assertion of colonial power and authority (Walter, 2010, p. 46). Assumptions of Western knowledge, methodologies and research underpinning data collection and statistics have tended to exclude Aboriginal and Torres Strait Islander values and perspectives (Smith, 2012). Located within such practices, Walter (2010) identifies the embedment of "racial capital" (p. 48) and the "presumptive objectivity" (p. 53) in the collection (and subsequent statistical treatment) of data relating to Aboriginal and Torres Strait Islander peoples in Australia.

The so-called impartiality of Aboriginal and Torres Strait Islander statistical data collection in Australia is a problematic assumption, not the least because it is implicated by the political and racial assumptions and values of those gathering data and framing the questions (Walter, 2010). Taylor (2011) is highly critical of using a "postcolonial demography" (p. 287) approach to the collection of Indigenous statistics for comparative purposes, benchmarking

with non-Indigenous populations, suggesting that such statistics can be misleading since they do not reflect Indigenous worldviews or geographies.

Pioneering work which addressed the issues of data and statistics for Aboriginal and Torres Strait Islander peoples has been undertaken in the health sector. Significant progress has been made to identify and address issues, and to move towards the development of data quality frameworks to guide practice and policy development (COAG Reform Council, 2012, 2013).

There are international examples of the issues in higher education data quality and statistics (c.f. Bonaccorsi, Daraio, Lepori, & Slipersaeter, 2007; Deacon, Osman, & Buchler, 2009). In the education sector, data and statistics have found a particular resonance with the advent of "league tables" and comparative indicators (Broadbent, 2004, p. 4). Yet such data are often produced and presented in ways that many authoritative sources find dubious (Adelman, 2010, p. 1). In the Australian higher education sector many similar issues emerge but have not been systematically addressed until recently (Kinnane, Wilks, Wilson, Hughes, & Thomas, 2014; Phillips KPA, 2012). Data collection in higher education "has evolved over the years in a somewhat haphazard way with little formal planning, subject only to occasional, ad hoc reviews" (Phillips KPA, 2012, p. 71). The Australian Department of Education and Training response to these criticisms is discussed in more detail below.

In this discussion paper, presented in two related parts, we explore some of these assumptions, issues, conundrums and frustrations, as well as possible approaches to the complex nature of data and statistics in the area of Aboriginal and Torres Strait Islander participation in higher education. In Part 1 we will present a sample of available statistics regarding Aboriginal and Torres Strait Islander participation in higher education to illustrate some of these issues. We question the extent to which these statistics are accurate, reliable and valid in the mathematical or statistical sense but also, and importantly, their validity, reliability and representativeness in Aboriginal and Torres Strait Islander cultural contexts.

Our primary objectives are firstly to identify, summarise and analyse the issues of Indigenous data and quality of statistics in higher education; secondly, to develop a template for shared statistical literacy among the diverse stakeholders in the field of higher education; thirdly, to propose draft principles for a data quality framework as an exemplar for good practice, and as an explicit accountability mechanism. In doing so the intention here is to mitigate the misunderstandings, misapprehensions and misuse of data and statistics which persist in the field.

In Part 2 we examine a range of culturally appropriate quality indicators associated with the Aboriginal and Torres Strait Islander elements of a data dictionary in higher education. Our objectives in Part 2 are to provide a brief introduction to the definition and purpose of a data dictionary; compare two data information systems, the Australian Institute of Health and Welfare (AIHW) data dictionary and the Higher Education Information Management System (HEIMS) for examples of data consistency; and to propose definitions and support for data collectors and users with a view to improving and further developing a National Higher Education Data Dictionary with a focus on Aboriginal and Torres Strait Islander data.

Part One

The context for elaborating data quality issues

Data and statistics relating to Aboriginal and Torres Strait Islander participation in higher education are obtained from a variety of sources. Australian Government higher education data sources include: the Department of Education and Training (previously the Department of Education, and the Department of Education, Employment and Workplace Relations (DEEWR); the Department of Industry (previously the Department of Industry, Innovation, Climate Change, Research, Technology and Science); the Australian Bureau of Statistics; the Tertiary Education Quality and Standards Agency (TEQSA); individual universities through data collections contributing to reports such as the annual Indigenous Education Statements (IES); and state Vocational Education and Training (VET), and private, providers.

The access, participation, retention, completion and transition rates for Indigenous higher education students are significantly lower than those of non-Indigenous students (Behrendt, Larkin, Griew, & Kelly, 2012; Department of Education Employment and Workplace Relations [DEEWR] & Bradley, D., 2008; Devlin, 2009). This underrepresentation contributes to the unrelenting cycle of disadvantage on almost all headline indicators (Behrendt et al., 2012, Steering Committee for the Review of Government Service Provision, 2011, Australian Indigenous Health*InfoNet*, 2014. In 2013, students who self-identified as Aboriginal and Torres Strait Islander on enrolment made up 1.0 per cent (13,781) of all university enrolments (1,313,776), a 9.1 per cent increase from 12,632 in 2012; and 1.2 per cent of all commencements (537,886), an increase of 7.7 per cent from 2012 (5,824 to 6,275) (Department of Education, 2014a). The Behrendt et al. (2012) review of Indigenous higher education suggested a population parity rate of 2.2 per cent as the aspiration, reflecting the proportion of the population aged between 15 to 64 years of age that is Aboriginal and/or Torres Strait Islander (based on 2006 ABS population statistics). The Department of Education Employment and Workplace Relations on the other hand, argued for a parity rate of 3.1 per cent as an estimate of the proportion of Australian students expected to be Aboriginal or Torres Strait Islander, "if Aboriginal and Torres Strait Islander peoples were represented according to their proportion of the higher education aged population" (Panel for the Review of Higher Education Access and Outcomes for Aboriginal and Torres Strait

Islander people, 2011, p. 3). Already we can see some issues emerging. Firstly, the figure depends on self-identification as Aboriginal and/or Torres Strait Islander. The figures are almost certainly an underestimation given that some students may choose not to identify for a range of reasons discussed later in the paper (also, see Wilks & Wilson, 2014, 2015), and two lead agencies for data collection, collation and analysis differ in the manner in which parity is conceptualised and calculated.

Secondly, the Department of Education and Training statistics depend on internal reporting of universities which vary by institution. The Bradley Review (Department of Education Employment and Workplace Relations [DEEWR] & Bradley, D., 2008), (and more recently the Behrendt review [2012]), utilised ABS data from 2006; 6 years out of date at the time of publication. National and state Aboriginal or Torres Strait Islander student enrolments and national completions are shown below in Table 1 and Table 2 below.

Table 1: Aboriginal and Torres Strait Islander university commencements, total enrolments and completions, 2013 (Department of Education, 2014a, b)

Aboriginal and Torres Strait Islander students	**Female**	**Male**	**Total**
Commencements	4,141	2,134	6,275
Total enrolments	9,148	4,633	13,781
Completions	1,257	602	1,859

Table 2: Indigenous higher education enrolments by state/territory, 2013 (Department of Education, 2014a)

State/territory	**Aboriginal and Torres Strait Islander enrolments**
Australian Capital Territory	363
New South Wales	4,898
Northern Territory	709
Queensland	3,159
South Australia	866
Tasmania	379
Victoria	1,622
Western Australia	1,184
Multistate (Australian Catholic University)	396

The available statistics collectively and consistently highlight that access, retention, and completion rates for Aboriginal and Torres Strait Islander higher education students are significantly lower than those of non-Indigenous students (Andersen, Bunda, & Walter, 2008; Department of Education Employment and Workplace Relations [DEEWR] & Bradley, 2008; Behrendt et al., 2012).

From these figures we can see several important conceptual and methodological issues emerging that are discussed in more detail below.

Conceptual and methodological issues

In the following section we outline the key conceptual issues that underpin the paper.

Evidence-based decision making

We are currently in an era where evidence-based policy making, or data-informed decision making (Allen, 2002), is crucially important (Prout, 2010). Data and statistics concerning the same populations are obtained from a variety of sources. Most of these sources have shortcomings that will be enumerated below. These data issues have proven to be frustratingly persistent despite the best efforts of many government, industry and research groups (Australian Institute of Health and Welfare & Australian Bureau of Statistics, 2006; Gilbert, 2010; Trewin, 2002). Further, frustration can arise from the transition of data into statistics, and discrepancies in the reporting of data for particular purposes (Jordan, 2012). Biddle (2014) has noted that despite an "array of data about Indigenous Australians" many gaps persist in "our understanding of Indigenous demography, health, socioeconomic status and wellbeing" (p. 5).

Nevertheless, the Australian Bureau of Statistics (2010b) argues that, "evidence-based decision making requires a systematic and rational approach to researching and analysing available evidence to inform the policy making process". The ABS further states that evidence-based decision making has the following advantages as it:

- Helps ensure that policies are responding to the real needs of the community, which in turn, can lead to better outcomes for the population in the long term.
- Can highlight the urgency of an issue or problem which requires immediate attention. This is important in securing funding and resources for the policy to be developed, implemented and maintained.
- Enables information sharing amongst other members of the public sector, in regard to what policies have or haven't worked. This can enhance the decision making process.
- Can reduce government expenditure which may otherwise be directed into ineffective policies or programs which could be costly and time consuming.
- Can produce an acceptable return on the financial investment that is allocated toward public programs by improving service delivery and outcomes for the Australian community.
- Ensures that decisions are made in a way that is consistent with our democratic and political processes which are characterised by transparency and accountability.

  (ABS, 2010b)

It is incumbent on those utilising an evidence-based approach to ensure that the evidence is of sufficiently high quality to render it unimpeachable.

Use and abuse of statistics

Data are indicators or building blocks, and nothing more (Broadbent, 2004).[3] However, once converted into statistics they assume the power to persuade, and as Walter (2010, p. 53) accurately (if somewhat cynically) pointed out: "Statistics do not lie, but neither do they always tell the truth". Statistics, despite their illusion of "value-neutrality" (Jordan, Bulloch,

[3] A key distinction exists between data and statistics. For example, Schield (2004) defines this difference as statistics summarising data, with the statistical summaries influenced by the contextual collection, selection and manipulation of data to output for specific reasons. Data are indicators, nothing more (Broadbent, 2004). However, once converted into statistics they assume either deliberately or unwittingly the power to persuade. In this review we acknowledge that we are often conflating data with statistics; however there is an indivisibility of data and statistics when it comes to articulating the issues.

& Buchanan, 2010, p. 352), exist within the frameworks in which they are interpreted and used for various purposes to inform cultural, social, economic, and/or political understanding and action. Walter (2010) echoes this sentiment that "data are data, but then political and social reality is framed by how they are garnered and interpreted, by whom and for what purpose" (p. 53). Jordan (2012), in her critique of Andrew Forrest's public claims for the success of his Indigenous employment program (the Australian Employment Covenant), gives a striking contemporary example of the way that statistics are used as a rhetorical device to achieve particular political ends. A careful yet relatively simple analysis reveals that the statistics do not support the argument advanced (Jordan, 2012).

The underlying factors and knowledge bases involved in the understanding (and misunderstanding) of statistics indicate the complexities of this domain (Gal, 2002). Broadly speaking, the issues relating to the misleading or deceptive use of statistics may be categorised as one or more of the following:

> **Naïve fallacy**—a failure to properly understand;
> **Deceptive fallacy**—the deliberate manipulation of statistics towards some desired end; and
> **Scientific fallacy**—the belief that statistical or numerical data are inherently trustworthy or more worthy than other forms of knowing (Broadbent, 2004, p. 4).

Succumbing to these fallacies will invariably "pervert the route to understanding" the complex and nationally vital issue of Aboriginal and Torres Strait Islander participation in higher education (Broadbent, 2004, p. 6). In this discussion paper, we seek to achieve several interrelated goals in the ultimate pursuit of a data quality framework that may be used to guide data and statistics collection, aggregation, analysis and importantly interpretation, and at the same time provide a template against which the use of statistics in this area may be interrogated and held accountable.

Interpretive / epistemic communities

In the higher education sector there are multiple intersecting communities of interest. For example:

- professional (within which there are multiple communities – demographers, statisticians, social scientists, and so on)
- bureaucrats and administrators (within government, the sector and community)
- higher education leadership
- lay community (including Indigenous and non-Indigenous).

To understand the complexity and diversity of stakeholders in the field we will draw on the work of Throgmorton (1991, 2000) and others on the rhetoric of policy analysis. Various stakeholder groups can be conceived as different "epistemic" or interpretive communities; networks of experts who share "causal beliefs and policy goals" (Cross, 2013, p. 142), each with their own unique language, syntax, rules, beliefs, motivations and cultures that lead them to comprehend issues, data and phenomena differently. These differences culminate in perspectives that are *experience distant* from one another despite an often superficially shared language. The goal of seeking a shared language is to move from *experience distant* to *experience near*. *Experience near* is most often found at the intersections of epistemic / interpretive communities. We seek to facilitate a shared statistical literacy that enhances *experience near.* However this requires a deal of goodwill (or what Throgmorton called a "sustainable economy of spirit" [2000, p. 376]). It is common for members of one interpretive community to devalue or even denigrate the beliefs and views of members of another interpretive community usually based on stereotypical inferences (Throgmorton, 2000). In this sense interpretive communities are also often socially constructed with respect to particular issues (Leiserowitz, 2007). Indigenous and non-Indigenous participants in the higher education sector also constitute socially, historically, culturally and politically constructed interpretive or epistemic communities, and in this instance the *experience near* will be found in the intercultural space (Nakata, 2013).

Indigenous terms of reference / whiteness – the "dual lens"

This work is produced from a position that recognises Aboriginal and Torres Strait Islander research principles; an acceptance of Indigenous sovereignty that values and privileges Indigenous knowledge, voices and perspectives in research; and the importance of demonstrable community benefit (Australian Institute of Aboriginal and Torres Strait Islander Studies [AIATSIS], 2012; Moreton-Robinson & Walter, 2009; Nakata, 2007; National Health and Medical Research Council [NHMRC], 2007; Smith, 2012). We aim to articulate a statistical framework where the data needs of Aboriginal and Torres Strait Islander peoples are shared and balanced with those of the existing non-Indigenous instrumentalities. This also acknowledges the underlying positions and contexts of the researchers gathering the data.

We argue that it is important for non-Indigenous and Indigenous participants in the sector to (re) position themselves with a clear reflective dual lens (Drew, Adams, & Walker, 2010) of whiteness and Indigenous Terms of Reference (Oxenham, 2000). The dual lens promotes simultaneous refection on the implications of white privilege (and the associated colonising practices) *and* Indigenous worldviews for understanding this contested and complex domain (Nakata, 2007; Walter, 2010). This mitigates against the dangers of "separate practice" and promotes a deeper understanding of the intercultural space (Nakata, 2013, p. 6). The dual lens is not about "resistance to, and rejection of, Western theory and knowledge, theory and practice" (Nakata, 2013, p. 8), but rather about seeking that shared space and *experience near*.

A commitment to privileging Aboriginal and Torres Strait Islander knowledge does not in any way represent an *ipso facto* acceptance of a diminution of standards of excellence in relation to non-Indigenous data collection and data quality. Rather it is a recognition that data and statistics are not value free; they are sociocultural, historical and political constructions that serve particular agendas. A commitment to privileging Aboriginal and

Torres Strait Islander knowledges is a de-powerment strategy[4]. When situated within the intercultural space in the way argued by Nakata (2013) it becomes a site for authentic critical reflection on practices that serve to reproduce rather than transform.

Strongly related to this is the importance of developing a strengths-based narrative. The Aboriginal and Torres Strait Islander sector is replete with deficit-based thinking that has infused public policy and debate for many years. Walter (2010) described many data collections as the "…statistical portrayal of Indigenous dysfunction" (p. 45). Deficit thinking has served to promulgate policies, practices, services and programs that further marginalise Aboriginal and Torres Strait Islanders in Australian society. This has perhaps been most evident in the health sector where numerous national reports chronicle the large health gap between Indigenous and other Australians (see Australian Institute of Health and Welfare, 2009), Australian Indigenous Health*InfoNet* (2014) and the Overcoming Indigenous Disadvantage reports from the Steering Committee for the Review of Government Service Provision (2011). It is noteworthy that these and other organisations have publicly declared a commitment to shifting the narrative from deficit to strengths-based approaches. While some have noted that the Overcoming Indigenous Disadvantage report measures "illbeing" not "wellbeing" there is increasingly a strengths-based future orientation to recent reports (Jordan et al., 2010).

Walter (2010) provides an excellent example of strength-based versus deficit-based questions by contrasting "How do Indigenous people grow strong" versus "How poorly do Indigenous children perform compared to non-Indigenous children" (p. 53). This also exemplifies the deficit approach behind much comparative data, and binary or dichotomous thinking (Nakata, 2013; Walter, 2010).

[4] Depowerment is the often overlooked counterpoint to empowerment. If we empower individuals and groups without a concomitant effort to "depower" the powerful, we may in fact set the initiative up to fail.

The need for a shared critical statistical literacy

Clearly the conceptual and methodological issues discussed above indicate the need for a shared critical statistical literacy. Walter's (2010) observation that, "…statistics provide an interpretive mechanism for societal understandings across social, cultural, economic and political dimensions" (p. 45) is a rallying call for enhanced critical statistical literacy. The ABS has a strong commitment to enhancing statistical literacy and describes four competencies that underpin the concept: data awareness; understanding statistical concepts; analysing and evaluating statistical information; and, communicating statistical information. We do not think this goes far enough. Nor does it fully articulate the complexities of statistical literacy in cultural contexts. Once again we can turn to the health sector for guidance. The concept of critical health literacy provides a useful framework for articulating the domain of critical statistical literacy.[5]

Zarcadoolas, Pleasant and Greer (2003) describe four key domains of health literacy: fundamental, scientific, community (civic) and cultural. Vass, Mitchell, and Dhurrkay (2011) have utilised this conceptualisation to examine Australian Aboriginal critical health literacy. While the first two are essential and foundational, the last two domains are crucial in the pursuit of culturally appropriate critical health literacy, as they are in pursuit of critical statistical literacy. Community (or civic) literacy refers to an ability to identify the motivations and agendas behind health policy and practice in order to name and interrogate them. This is known as the literacy environment. Cultural health literacy involves recognising cultural knowledge, worldviews, customs and practices and understanding how they impact on health and health-related behaviour. So, drawing on these principles, critical statistical literacy may be defined as:

> *The evolving skills and competencies needed to find, comprehend, evaluate and use statistical information and concepts to make educated choices. A statistically literate person is able to apply concepts and information to novel*

[5] It is estimated that 60% of Australians have poor health literacy (Australian Commission on Safety and Quality in Health Care, 2014). It is almost certain that poor statistical literacy rates are much higher than this.

> *situations. A statistically literate person is able to participate in ongoing public and private debates about statistics, scientific knowledge, and cultural beliefs. This debate, in turn, advances statistical literacy, individually and collectively.*
>
> (Adapted from Zarcadoolas et al., 2003)

The important consequences of enhanced health or statistical literacy are:

- empowerment, providing opportunity for voice, agency and self-determination (De Walt et al 2010)
- improved data-informed decision making
- enhanced capacity for cross-jurisdictional understanding
- enhanced capacity to recognise, avoid and refute naïve, scientific and deceptive fallacies.

Assertoric knowledge

To date, the "objective" statistical data and analysis in relation to Aboriginal and Torres Strait Islander peoples continues to reflect a non-Indigenous epistemological, ontological and axiological viewpoint despite the efforts of key Indigenous advisory and representative groups such as the National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (NAGATSIHID) and the National Indigenous Reform Agreement Performance Information Management Group (NIRAPIMG). As noted above, gathering statistics and the uses for which they are deployed is a discursive act that serves social, political, cultural and historical functions. We interrogate the discursive practices within the field of Indigenous higher education statistics and, in doing so, we do not seek ultimate or immutable truth *per se,* but rather to create items of assertoric knowledge (Polkinghorne, 1983).

Assertoric knowledge is *asserted* to the communities of interest in ways that make it available for debate rather than foreclosing on a preferred immutable truth. In this paper, we offer a point of provocation to challenge the dominant discursive agendas around the collection and use of data and statistics relating to Aboriginal and Torres Strait Islander

peoples. Assertoric knowledge guards against the development of uncritical polarities or binaries to create an authentic discourse in the middle ground. Assertoric knowledge claims, by their nature, are more open to "complex analysis, less certain conclusions and open to all ideas and politics" (Nakata, 2013, p. 9-10).

Statistical and data quality issues[6]

Data and statistics relating to Aboriginal and Torres Strait Islander peoples present unique challenges and opportunities. While much has been done in recent years to improve access to, and the quality of, data (Allbon & Trewin, 2006; Gilbert, 2010; Trewin, 2002), more remains to be done; an example of this being the COAG Reform Council (2012) report on Indigenous health. The report, though comprehensive, is replete with examples of missing data and the problems of lack of comparability across states (COAG Reform Council, 2012). Some examples include "timeliness… accuracy of the trends reported", lack of data for some "targets" and the variations of Indigenous "identification" rates (COAG Reform Council, 2013, p. 73). Similarly, Prout (2010), in her report on population mobility in Aboriginal and Torres Strait Islander primary school students, noted that "...with regard to one of the cornerstones of the Labor government's *Closing the Gap initiative – Indigenous education* – the reliability of the evidence base has been repeatedly called into question" (p. i). While Prout was referring to particular data relating to attendance and mobility, the issues she identified permeate the Indigenous data collection field. A key question here is, for whom and why are such data collected?

There have been significant steps taken in recent years to improve the quality of data provided to policy and decision makers. The ABS has played a lead role in this respect, for example the National Aboriginal and Torres Strait Islander Social Survey (NATSISS) (ABS,

[6] Many, if not all the issues discussed, have been identified in other sectors such as health. Some have been explicitly identified within the Higher Education sector directly while others impact collaterally as sources of data that inform Higher Education statistics. In order to present as comprehensive a picture as possible, all are discussed in this section. Clearly though, the locus of responsibility for their resolution will be shared across jurisdictions.

2010c) and the Australian Aboriginal and Torres Strait Islander Health Survey (AATSIHS). In another example, (and more on this later), Allen (2002) described the need for quality management in data services where quality is defined as data that is "fit for purpose" (Allen, 2002, p. 1). Data needs are assessed through a decision-making cycle containing "Quality Declarations" and "Quality Assessments" (p. 1). The ABS (2011a) has identified and committed to seven data quality dimensions developed by Statistics Canada (these being: institutional environment; relevance; timeliness; accuracy; coherence; interpretability; and, accessibility).

In recent years a number of studies have called for measures to improve the coordination and interaction of existing data (International Standards Organization, 2004; National Forum on Education Statistics, 2009; Hamblin & Phoenix, 2012; Biddle, 2014). The Department of Education and Training has undertaken reviews of reporting and data collection (Phillips KPA, 2012; Department of Education, 2013). These reviews focussed largely on the broader higher education reporting landscape and identified several areas of concern including: lack of coordination; accumulation of reporting requirements over time; definitions and documentation; scale and proportionality; instability in reporting requirements and inadequate planning for change; and accessibility and timeliness (Phillips KPA, 2012, p. 71).

There are currently approximately 46 data collection mechanisms for higher education (Phillips KPA, 2012). This variety of collection points, repositories and consequently data definitions, negatively impacts on the reliability and consistency of data sets and data interpretation. This carries with it the potential to result in misinformation, a lack of funding or inappropriate or untargeted programs for prospective students and students in the higher education sector.

The Department responded to the Phillips KPA review accepting the majority of the 27 recommendations and is at the time of writing this discussion paper, six months into a four-year project that is seeking to streamline the collection and storage of higher education data, and to aggregate data into a single repository. This may be a 'slow build' with

universities requiring considerable lead-in time and support to ensure the data that is supplied to the repository is robust (Pers. Comm). It is understood that this project also involves the development of a comprehensive higher education data dictionary and the development of a mechanism to cross reference data collected by various agencies and organisations.

While the overall significance and timeliness of this project for the handling of the sector's data is self-evident for the collection, storage, analysis, interpretation and presentation (as statistics) of Aboriginal and Torres Strait Islander higher education data, it remains subject to substantial variations in policy, resourcing, political philosophies and also in the administrative reconfigurations of federal government departments. The project team undertook an examination of the three main data collection and information sources currently used and accessed in the higher education sector. Table 3 summarises the findings from this examination including the general function of the source, provisions made to define data elements, and the extent to which Aboriginal and Torres Strait Islander data is defined or explained. Investigation of these sources identified several aspects which have impacted negatively on data quality, and highlighted the limited information given for Aboriginal and Torres Strait Islander data in the sector. These included:

- Types of data were inconsistent and varied from source to source.
- Access to definitions of data elements or to a data dictionary was limited.
- The use and definition of data elements were inconsistent across the sources which did provide definitions.
- Information on data and data element definitions related to Aboriginal and Torres Strait Islander information was extremely limited. The scope for data elements relating specifically to Aboriginal and Torres Strait Islander students was limited to "self identification" in relation to being a) Aboriginal b) Torres Strait Islander c) both Aboriginal and Torres Strait Islander, or d) neither Aboriginal nor Torres Strait Islander.

Table 3: Data collection and information sources—Higher Education Sector

Data Source	**Function**	**Data Element Definition/Data Dictionary**	**Aboriginal and Torres Strait Islander data elements**
The Department of Education and Training—Higher Education Statistics https://www.education.gov.au/higher-education-statistics	Majority of higher education statistics in the form of specified sets of data, uCube custom tables or as custom ordered sets of data. However, higher education providers do not always report data to the Department of Education and Training, and some may only partially report to them. These are then captured by the Tertiary Education Quality and Standards Agency (Statistics report on TEQSA higher education providers, 2014. http://www.teqsa.gov.au/news-publications/statistics-report-teqsa-registered-higher-education-providers).	No evidence of provision for data element definitions or a data dictionary. No link to HEIMS or other data dictionary provided.	No data element definitions or a data dictionary. Reports utilised the term Indigenous for the purposes of identifying these students.
TEQSA—Tertiary Education Quality and Standards Agency http://www.teqsa.gov.au/	TEQSA requires all higher education providers to be registered and to report data which is then published in the annual Statistics Report on TEQSA Registered Higher Education Providers. The report provides broad information on higher education statistics. There is no facility to directly access or order TEQSA data.	Information on data element definitions to assist in collecting, accessing and interpreting data is difficult to locate from this source. A link to the HEIMS glossary and to data element definitions in the TEQSA 2013 Provider Information Request Reference Document on the second last page of the report (http://www.teqsa.gov.au/sites/default/files/Reference%20document%20Final%20V1.1.pdf).	Used HEIMS data elements and glossary.

Data Source	Function	Data Element Definition/Data Dictionary	Aboriginal and Torres Strait Islander data elements
HEIMS—Higher Education Information Management System http://heimshelp.education.gov.au/sites/heimshelp/pages/welcome	Electronic system. Provides information about requirements and procedures for the collecting and reporting of higher education data.	Provides a link, on home page, to definitions for data elements as well as scope and structure for data files.	Used the term Aboriginal and Torres Strait Islander for the purposes of identifying these students. Did not include the term Indigenous in the glossary or data elements.
ABS—Australian Bureau of Statistics http://www.abs.gov.au/	Provides a range of statistics relating to higher education.	Has a section that elaborates on the meaning of main terms used to describe data for each set of statistics and key findings. However, locating definitions in the bulk of explanatory notes can be difficult. Has a census dictionary for terms used in the census survey. These definitions are not linked to the HEIMS data elements definitions.	Used the term, Aboriginal and Torres Strait Islander for identifying individuals for statistical reports. However, used the term Indigenous for Indigenous Household Indicator.

Part 2 of this Discussion Paper contains the background and some suggested new elements in the development of culturally appropriate quality indicators associated with the Aboriginal and Torres Strait Islander elements of the HEIMS data dictionary.

The paucity and inconsistencies associated with information on and for Aboriginal and Torres Strait Islander higher education data creates significant issues for its collection, access, use and interpretation. Examples include: missing, limited or unavailable data for some target groups (COAG Reform Council, 2013; Miller, 2007; O'Neill, Kirov, & Thomson, 2004; Productivity Commission, 2011; Tiplady & Barclay, 2007); incomplete or inconsistent data (Pechenkina & Anderson, 2011); and lack of standardisations in reporting and data collection (Department of Education, Employment and Workplace Relations, 2011b; Pakeha, 2011). Additionally, the rates of identification and the projection of Aboriginal or Torres

Strait Islander populations change over time (Biddle, 2014; COAG Reform Council, 2013; Wijesekere, 2008), student identification as Aboriginal or Torres Strait Islander across Years 7 to 12 varies, and attendance and enrolment data from government, Catholic and independent schools cannot be aggregated (Steering Committee for the Review of Government Service Provision, 2011)—factors all leading to inconsistencies in "apparent" school retention rates and transition (to higher education) data (Australian Bureau of Statistics, 2011b).

In the health field, critical health issues have been conceptualised as upstream (those that derive from social structures and social policies, norms and practices), midstream (those that impact or emanate from the community) and downstream (those factors that have a direct impact). Similarly, issues in data quality for Aboriginal and Torres Strait Islander Higher Education statistics might usefully be viewed applying this framework. The key issues to emerge are explained in detail below, and a summary can be seen in Table 4.[7]

Upstream

Data needs / scope

This is fundamental to data quality. Data and statistics must be, as Allen (2002) noted, "fit for purpose" (p. 1). This is inevitably a values choice and "clearly implies a judgement about what needs to be done" (Jordan et al., 2010, p. 337). What is the fundamental purpose for gathering data and deriving statistics? In the higher education sector there are, of course, multiple operational purposes, including attraction, retention, transition, completion, course experience. Funding has also been a core driver for data collection and management. Recently, however, as one respondent noted, there has been a shift to higher order motivations. These motivations include (or ought to include) institutional status, reward or profile linked to the achievement of these higher order aspirations. Such higher-order purpose to guide our thinking is evident in the Māori Statistical Framework (Wereta &

[7] The issues are artificially disaggregated for the purposes of clarity and analysis. They are clearly interrelated in a complex web of (mis)understanding.

Table 4: Data Quality Issues: Summary

Upstream	**Data needs / scope**	What do we need to know? Why do we need to know it? This relates to the issue of strengths-based versus deficit-based thinking.
	Data misuse and abuse	The political, social, cultural, racial motivations, including the impact of: • cultural issues • colonisation • "ghettoising" / "exoticising"
	Data consistency	Jurisdictional differences among states, Incomparability between private and public sector representatives (such as schools and Universities).
Midstream	**Data completeness**	Lack of Indigenous data from some sources Missing or inconsistent data from some providers Data for underrepresented groups are scarce and not easily accessible. Underrepresentation linked to self-identification practices
	Data collection methods	Culturally inappropriate data collection methods.
	Data definitions	Misunderstanding, or inappropriate definitions and nomenclature.
	Data Appropriateness	The appropriateness and sensitivity of data to cultural / community concerns.
	Data levels of analysis	What is an appropriate level of measurement: individual vs group vs sector
Downstream	**Data Availability**	Online access. Timeliness of reporting.
	Data type	Quantitative vs qualitative
	Data standards	Quality of indicators: • reliability and validity • sampling • sample size.
	Data storage and security	This includes the important issue of ownership and stewardship of data.
	Data Determinism	Data determinism refers to the tendency to use a scattergun rather than a strategic and informed approach to data collection.
	Data changes over time	Lack of longitudinal data.

Bishop, 2004) that has a core focus on enhancing Māori wellbeing. In Australia, the participation of Aboriginal and Torres Strait Islander students in education is key to social inclusion, is a core goal of the Closing the Gap initiatives, and data must be tied to these overarching goals (Pechenkina & Anderson, 2011). However, this association should not be uncritical. Jordan et al. (2010) note that while the Closing the Gap targets recognise the importance of culture, almost all the measures are a predetermined set of socioeconomic indicators to the exclusion of "Indigenous life projects" (p. 340).

If this is indeed the core purpose then it suggests, and in fact demands, a strengths-based approach. This values-centred position has become an important feature of attempts to close the gap between Indigenous and other Australians, and quality data should serve this agenda and guide the selections and development of indicators.

Data misuse and abuse

This element of data quality has been discussed earlier in the paper. Data quality should be judged against the fallacies outlined by Broadbent (2004). The naïve, the scientific and the deceptive fallacies should be identified, named and addressed. This of course is a central goal of culturally appropriate critical statistical literacy. For many authoritative figures, Australian Indigenous statistical treatments are "fraught with contradictory exclusionary practices" (Walter, 2010, p. 46). Any data collections or treatments that serve to further marginalise, "exoticise", pathologise, subjugate or "ghettoise" Aboriginal and Torres Strait Islander people through ignorance or Machiavellian intent are the antithesis of data quality and must be resisted. The "dual lens" provides an opportunity for reflexivity in this respect. This challenge must be met through active engagement in the intercultural space (Nakata, 2013).

Data consistency

Inconsistent datasets and processes for collection can lead to difficulties with understanding and planning for the successful transition of Aboriginal and Torres Strait Islander peoples into, and through, higher education (Kinnane et al., 2014; COAG Reform Council, 2012, p. 69). Analysis of the Australian Government's higher education provider of undergraduate

access and attainment statistics, reveals different outcomes for a population-parity model at the state level compared to a national population-parity model. Moreton-Robinson, Walter, Singh and Kimber (2011) recommended a reporting template that measures percentages of Aboriginal and Torres Strait Islander students against the size of the Indigenous population in the university's home state, rather than nationally, as such jurisdictional differences have the capacity to impact data quality.

The ABS census provides another example of data inconsistencies. The ABS gathers data from a census every five years. The last census in 2011 was the 16th national census. The census collects data from all members of dwellings on a particular night (Census Night). All citizens are legally obliged under the *Census and Statistics Act, 1905,* to participate in the census. The results of the 2011 census are being progressively released. Factors which may affect the quality, consistency and accuracy of the ABS data, include randomisation, classification changes and data lag (ABS, 2013b). Data in the census are subject to *random perturbation* to protect the identity of individuals, but by the ABS's own admission this can produce inconsistencies that users may find frustrating.

One other source of frustration for users is the changes in classification systems from census to census (ABS, 2013b, section 7). This means that there is an inevitable break in any time-series analyses. In 2011, for example, the census data will be based on the Australian Statistical Geography Standard (ASGS) rather than the Australian Standard Geographical Classification used in the 2006 census. The ABS argues that the new classification will enhance data analysis and comparative data with other sources using the same classification system. Other classification systems have also changed from 2006 to 2011 including occupations, industrial, cultural and ethnic groups, language, religious groups and countries. A final limitation of the census data is the lag between census dates and data releases. In a sense all these limitations are inevitable. To undertake a census more often would be prohibitively expensive for no real benefit and the delays in releases are inevitable given the vast amounts of data collected. The ABS has an array of products and services designed to streamline access and suitability of data (www.abs.gov.au). So the task then is

perhaps not to eliminate data limitations but to minimise them and better understand their impact on quality decision and policy making. It has also been noted that the general issues associated with the reliability and validity of census data are exacerbated for Aboriginal and Torres Strait Islander peoples (Martin et al., 2004).

Evidence of inconsistency and lack of coordination between former departments integrated into the Department of Industry, Innovation, Science, Research and Tertiary Education in 2012 and between other state and commonwealth government agencies has been noted. Phillips KPA considered this led to "poor definition and design and multiple reporting of similar information" (2012, p. 71-72). The advent of the National Advisory Group for Higher Education Data and Information (NAGHEDI) was an important step by the Department to improve coordination and consistency across the sector, although this group has now been absorbed into the TEQSA Advisory Council and replaced by a Higher Education Data Committee (Department of Education, 2013) which is overseeing the current Departmental project creating a national repository for higher education data.

Midstream

Data completeness

Nakata (2013) provides an excellent example of the issue of data completeness in higher education as part of his critiques of the politics of knowledge and knowledge production in the intercultural space. He contends that uncritical decolonising practices in pursuit of self-determination in Indigenous Education Units leads to the failure of some centres to utilise Western practices of statistical accounting of their student experiences, even at the demographic level. This failure stymies attempts to fully articulate Indigenous student experiences of higher education. In this failure of data quality, Indigenous Education Units and their leadership may become complicit in the reproduction of relative disadvantage for Indigenous students in the guise of self-determination and decolonising practice, as the deserved funding is not being attracted (Nakata, 2013).

Pechenkina and Anderson (2011) also noted data, relating to Indigenous student characteristics and socioeconomic indicators, were missing or inconsistent for some providers (COAG Reform Council, 2012, p. 69).

Self-identification is crucial to data completeness and has been a vexing issue for many jurisdictions, including higher education. Reliable and valid data and statistics in higher education depend on Aboriginal or Torres Strait Islander students' self-identification at the time of enrolment, and therefore are almost certainly an underestimation given that some students choose not to identify for a number of reasons including being unsure about the implications of self-identification, a perceived lack of clarity around the question itself, and confusion relating to self-identification with a dual heritage [see below] (Kinnane et al., 2014). Biddle (2014) points out that the contexts within which self-identification questions are asked vary, the implication of this being that "an individual may be recorded as having a different Indigenous status across collections or through time, making comparisons quite complex" (p. 5).

Young Indigenous people these days often identify as having two heritages—Indigenous and other. Additional questions for students around the self-identification question on enrolment may provide greater clarity and reassurance for Aboriginal and Torres Strait Islander students. For example, questions framed around how they live; the lifestyles chosen; aspects of family and community, "we need to do a lot better with this question, and interrogate our acceptance of data based on it. Aboriginal people haven't been allowed into the debate on questions of identification/identity" (Pers. Comm. 26/9/14).
Data completeness is complicated by the politics of Indigenous identification, with contested and shifting perspectives on who can claim to have Indigenous heritage (Wilson & Barnes, 2007). This is evident in the higher education sector particularly in relation to scholarship and benefits (Kinnane et al., 2014), and also raises the issue of the contextual or circumstantial drivers of whether to identify or not. People may feel comfortable identifying in some circumstances but not in others (for example, for fear of discrimination, or a lack of trust around how the data may be used) (Kinnane et al., 2014).

Data collection methods

In Indigenous communities this has a particular importance. The literature is replete with examples of inappropriate data collection methods. This has led to widespread suspicion and mistrust regarding the motives of non-Indigenous researchers. The same is true of the motives of those who gather data for administrative collections. Consultation and engagement with Aboriginal and Torres Strait communities is essential to gathering quality data. "Without a successful engagement strategy quality will be compromised" (Brent & Rogers, 2008, p. 2). In Indigenous contexts, data collection methods and approaches require the building of relationships of trust (Taylor, Doran, Parriman, & Yu, 2012), the incorporation of cultural considerations, and the scoping of variations in definitions and terminology across different geographic areas and amongst peoples (Doyle & Prout, 2012; Martin et al., 2004). Developing trust means engaging on authentic relationship building for the long term. Fly–in, fly–out methods will not yield optimum results. Authentic capacity building for local research-based practices is better suited. This was amply demonstrated in a recent demographic survey of Yawuru people in the West Kimberley (Taylor et al., 2012), in which the researchers were local community members trained and supported to gather data according to high standards of research practice. The net result was greater participation and significantly enhanced trustworthiness and credibility in the data, and thus significantly enhanced data quality.

Data collection is a time consuming and resource intensive activity that is often given insufficient priority in workload allocations within higher education institutions. For example, the Australian Government's Indigenous Support Program requires universities to report on their performance, expenditure and targets through Indigenous Education Statement reports. However, many Indigenous Education Units have neither the resources nor the time to be able to write these reports to the best of their ability (Kinnane et al., 2014).

Data definitions

The way that data are defined can have particular implications for Aboriginal and Torres Strait Islander collections. Prout (2010), for example, noted that definitions of school attendance may vary. Similarly, Martin et al. (2004) argued that the census was unsuccessfully deployed in remote Aboriginal communities because of a fundamental misunderstanding of the term "household". Aboriginal household structure may have very different meanings leading to significant issues of potential over or under counting on census night. Also, definitions of household income are based on assumptions that simply may not apply to Aboriginal experience. For example, for many Aboriginal people income is sporadic, meaning that the definition of "income" as derived in fortnightly increments simply makes no sense (Martin et al., 2002). For census purposes visitors are not counted as part of the household but for Aboriginal people with a highly fluid social and familial structure this may not be an appropriate definition. Martin et al. (2004) also described ambiguities around the term "closest relative". Some respondents provided responses that closely aligned with non-Indigenous understanding while others referred to kinship relationships and others to cultural or political affiliations. In the higher education sector, terminology may vary between institutions (Pechenkina & Anderson, 2011).

The issue of data definitions also has implications for the issue of identification. The self-identification question may be too coarse-grained to capture culturally appropriate relationships and community representations. This is related to analysis of terms such as "origin" versus kinship or language group but includes a more fine-grained analysis that avoids homogenising. Many data collection practices do not distinguish (or use interchangeably) "Indigenous" from "Aboriginal and Torres Strait Islander", nor do they clarify the distinctions among "Aboriginal", "Torres Strait Islander", "Aboriginal <u>and</u> Torres Strait Islander". Nakata (2013) has further questioned this by noting that both Indigenous and Aboriginal and Torres Strait Islander are essentially Western constructs.

In the higher education sector specifically, Phillips KPA (2012) slight differences have been noted between collections adding to the "workloads and levels of frustration within

Universities" (p. 73). Ambiguous or inconsistent definitions can also significantly affect the capacity to produce comparative data across the sector and further impact quality by lessening opportunities for benchmarking.

Research within the Aboriginal and Torres Strait Islander context has faced many issues with the reliability and consistency of the collection, documentation and usage of data and statistics (for example, Australian Institute of Health and Welfare, 2013b; Australian Bureau of Statistics, 2012b; Australian Bureau of Statistics, 2014; Biddle, 2014; Kinnane et al., 2014).

The International Standards Organization (2004) states:

> *Data processing and electronic data interchange rely heavily on accurate, reliable, controllable and verifiable data recorded in databases. A prerequisite for correct and proper use and interpretation of data is that both users and owners of data have a common understanding of the meaning and representation of the data. To facilitate this common understanding, a number of characteristics, or attributes of the data have to be defined. These characteristics of data are known as "metadata", that is, "data that describes data".*

Data collection methods in the Australian higher education sector are inconsistent and spread across a variety of agencies and government organisations (Phillips KPA, 2012). The further development and elaboration of a national higher education data dictionary would provide shared meanings and understanding for both users and owners of data. This would ensure there was a consistent set of metadata, data elements and data formats for proper collection, documentation and usage of data. It is understood that this is an element of the federal Department of Education and Training's current four-year project. Part 2 highlights suggested improvements to the Indigenous elements of the HEIMS dictionary.

Data appropriateness

The appropriateness of data is an important quality consideration. Prout (2010) noted, for example, data on attendance may be insensitive to issues such as mobility, which is a particular issue for many Aboriginal groups in rural or remote communities.

Data levels of analysis

The level at which data were collected (local versus sectoral versus national) is also implicated (and conflated with other issues discussed) in data quality. Data collected at too high a level of abstraction run the risk of homogenising Aboriginal and Torres Strait Islander groups. Measuring language or kinship groups (see above Data Definitions and Data Appropriateness), may be more culturally appropriate, but creates problems of confidentiality when cell (or sample) sizes are small, particularly at the institutional level.

Downstream

Data availability

The availability of data in the higher education sector also presents ongoing difficulties. For example, no data or statistics in higher education relating to Indigenous participation were available online prior to 2004 (Pechenkina & Anderson, 2011). Data for underrepresented groups are scarce and not easily accessible (Kinnane et al., 2014). Adelman (2010) has suggested that comparative statistics should be disaggregated based on a wider range of inclusion measures. This could, perhaps should, include underrepresented groups such as prisoners and people with a disability.

At the sector level, Phillips KPA (2012) identified timeliness as an availability issue with reporting requirements changing as policies and programs change. A lack of coordinated procedure and practices leads to delays in archiving redundant reporting requirements and implementing new practices. Another issue relates to timeliness of data exchange and access between universities and the Department. Universities report that they are required to provide large amounts of data to the Department but were then not provided equivalent access to data held by it. Phillips KPA (2012) noted that "universities would be far more willing to provide information if they had better access to it and if it could be used in ways which are useful to the institutions themselves" (p. 73).

Small sample size is a particular issue for Aboriginal and Torres Strait higher education statistics as evidenced by the earlier statistics on participation. This is exacerbated by the

underrepresentation as a result of issues with self-identification. For example, students entering university via Indigenous admission schemes are more likely to self-identify (Department of Education, Employment and Workplace Relations, 2011a), but may not always identify with regard to support services (Kinnane et al., 2014). As noted, with respect to levels of analysis this issue has implications for privacy and confidentiality.

Data type

With respect to data and statistics in higher education, the reporting regimes tend to favour quantitative measures over qualitative. While the methodological bias against the contribution of qualitative data in favour of quantitative has been largely ameliorated, decision-makers still display a preference for quantitative data to support their data-informed decisions. As noted by Einstein, "not everything that can be counted counts and not everything that counts can be counted". Mixed methods offer the summary and comparative advantages of quantitative data and the richness and depth of qualitative approaches. Together they enhance the overall data quality that has the potential to inform decision making. There are myriad examples of high quality data available from qualitative studies of Indigenous higher education (see Kinnane et al., 2014; Kippen, Ward, & Warren, 2006; Rigby et al., 2011; Willems, 2012). "Going beyond statistical analysis and attempting to understand what is happening across universities will help us learn what universities do well in terms of improving Indigenous educational outcomes, how they do it, and how these successful models can be replicated and expanded elsewhere" (Pechenkina & Anderson, 2011, p. 8).

Data standards

The impact of data standards is highlighted by Adelman (2010) in his illuminating critique of international comparisons. He argues that indicators misrepresent the situation when they fail to take a truly international perspective on the analysis. His analysis of the poor quality of indicators of participation, completion, and study pathways demonstrates that a relative lack of sophistication in the analysis can have a profound impact on the conclusions drawn that are likely to be almost entirely an artefact of the analysis rather than reflective of authentic trends. He shows that not including population trends over time (for example)

can seriously skew the data. In some countries, the declining proportion of youth means that the denominator falls and over time, with a lag for numerator changes, will culminate in participation rates rising dramatically, while in those countries where there is a rise in the youth population, the opposite will result (Adelman, 2010). Both are simply an artefact of the mathematics. In Australia, there have been, and will continue to be, increases in the proportion of young Aboriginal people in the population. If the same statistics for participation are used here then the same result will accrue; that is that the figures will show a statistically artefactual decline in participation. Adelman proposes two comparative indicators that offer some promise for resolving the issue – social inclusion and system flexibility.

The Behrendt et al. review (2012) suggested a parity rate of 2.2 per cent based on the proportion of Aboriginal and Torres Strait Islander expected to participate in Higher Education. The question of population demographics changing over time will impact performance against this parity rate. If the changing rate of, for example, Indigenous young people differs from the changing rate for the non-Indigenous youth population, (and this is a group that represents the greater proportion of higher education commencements), then the equity and participation ratios may differ artefactually. If the figures are based on population ratios and there has been an increase in the proportion of Indigenous youth in the population, then at least in part, the figures may be artefacts. But even if the figures are based on proportions of enrolments then the parity rate may be problematic if it is based on aggregated figures of the population between 15 and 54. Parity rates based on disaggregated cohorts (e.g. young people aged from 15 to 25) may be more appropriate (Adelman, 2010). There is also the problem of using ABS statistics relating to Indigenous people. Prout (2010) and Taylor et al. (2012) have long debated the problems with the ABS enumeration strategy for Indigenous people. This problem could possibly compound error.

In addition, problems arise from data aggregation because of the effects on sample size of the relatively smaller numbers of Aboriginal and Torres Strait Islander peoples living in

remote locations. This has the potential to render analyses “unreliable and not generalisable” (Walter, 2010, p. 46).

It is also important to acknowledge the impact of the consumers of data and statistics on data quality standards. Statistically illiterate consumers of data and statistics are essentially poorly calibrated instruments with the capacity to significantly undermine data quality by promulgating the naïve, the scientific and the deceptive fallacies. This degradation of the trustworthiness and credibility of the data can spread unquestioned throughout interpretive/epistemic communities, and in time assume a veneer of truth that is unsustainable under a more critically literate gaze. A poorly-calibrated instrument communicating with another poorly-calibrated instrument is likely to lead to a compounding error. For example, to quote figures for self-identification in higher education without a full appreciation of the cultural, definitional and statistical issues underpinning the concept may lead to misapprehensions that perpetuate deficit approaches to Aboriginal and Torres Strait islander participation.

At a more technical level, few consumers of data and statistics take the time to fully comprehend the data assumptions and treatments that underpin many (if not all) reported statistics. The earlier discussion of small sample size and the choice of denominator are two examples of the importance of understanding the conditional nature of statistical analysis. All statistical analyses embody choice. The choice not to report small sample sizes for statistical or ethical reasons has implications for the cultural sensitivity of the measure regarding community preference for analysis at the level of kinship or language groups for example. In statistical literacy terms, it is not the choice per se that affects data quality in the public realm; it is the failure to appreciate the implications of often unavoidable choices. Statistical analysis is an inexact science within which choices must be mindful and reasoned, not only in mathematical terms, but also in terms of the upstream, midstream and downstream issues.

Data storage and security

Data storage and security is essential to data quality and has significant cultural dimensions that are a consequence of poor research and data collection practices. Aboriginal people and communities have been "strip-mined" for research purposes for decades leading to very low levels of trust and confidence in data and statistics relating to their communities. As noted earlier, the work on Yawuru demography (Taylor et al., 2012) provides an excellent example of empowerment and ownership of the research enterprise but much still needs to be done. This issue clearly goes beyond the administrative and legal requirements for confidentiality to include the culturally sensitive issue of ownership and stewardship of data that impacts Aboriginal and Torres Strait islander people. An authentic sense of ownership and stewardship will enhance trust and confidence.

Data determinism

Data determinism refers to the tendency to use a scattergun rather than a strategic and well-informed approach to data collection. We should strategically and purposefully decide what data are required and then set about seeking it to the highest possible standard. Do not let the data lead. As one wry observer noted: "if you torture the data long enough it will confess" (Coase, 1981, p. 27). A scattergun approach encourages data torture and eventually, inevitably, misuse and abuse of data. In higher education there is evidence that across the sector there has been a tendency to scattergun (Phillips KPA, 2012).

Data changes over time

A lack of longitudinal and cross-sectional data limits our understanding about transition from school to higher education (Andersen, Bunda, & Walter, 2008; Biddle & Cameron, 2012; Biddle & Yap, 2010; Wijesekere, 2008; Wilson & Barnes, 2007), and improved data are needed to understand school student mobility and how this affects educational participation and outcomes (A. Taylor & Dunn, 2010; Wijesekere, 2008). For example, the Department of Education and Training's reporting methods have changed over time making comparisons difficult if not impossible (Pechenkina & Anderson, 2011). In their analysis of Indigenous student performance utilising enrolment, retention and completion rates

Pechenkina and Anderson (2011) noted that in the 1990s completions were reported by field of study rather than by the provider.

Biddle and Cameron (2012) also note the lack of longitudinal and cross-sectional data required to properly research and understand the factors that influence and encourage Aboriginal and Torres Strait Islander students in transitioning from school to higher education.

Rationale for a data quality framework in Aboriginal and Torres Strait Islander higher education practices

Data and statistics on and for Aboriginal and Torres Strait Islander people have been collected, interpreted and used for countless and contested reasons, purposes and interests by government departments, independent groups and researchers, for decades (Jordan, Bulloch, & Buchanan, 2010; Yu, 2011; Biddle, 2014). This paper has drawn attention to the lack of shared standards and understanding of data and subsequently of data elements in higher education data sets. It has identified issues associated with understanding data needs, the lack of data consistency, and inadequate data definitions. Current literature has limited focus on cultural appropriateness and quality standards concerning the collection, interpretation and use of data and statistics on and for Aboriginal and Torres Strait Islander students/people in the higher education sector. Much of the inquiry about data quality in recent years has been focused on the health sector. At present, there is no clear evidence of standards or guidelines for the collection, interpretation or usage of data on or for Aboriginal and Torres Strait Islander higher education students within data collection processes, nor for its storage in the main information repositories.

Useful elements may be drawn from the Australian Institute of Health and Wellbeing METeOR Online Registry (Australian Institute of Health and Welfare, 2013a), which could assist in building a conceptual picture to identify the considerations needed for improving the quality and cultural appropriateness of data associated with Aboriginal and Torres Strait Islander students in the higher education sector.

A compelling rationale for the development of culturally appropriate data/statistical quality frameworks is provided by Statistics New Zealand in its Māori Statistics Framework (2002). The authors commented that: “Māori were oblivious to official statistics and the impact they had on their lives” (Statistics New Zealand, 2002, p. 3). Community concerns were

raised when there was a realisation of the intimate connection between the statistics that were gathered and subsequent government decisions. Moreover, it was clear that governments had "their own reasons for collecting these statistics" (Statistics New Zealand, 2002, p. 3). For Māori, many of the issues discussed above were at play including the failure to include Māori worldviews and beliefs, culminating in an overarching belief that the prevailing practices were not relevant.

In the Australian higher education sector, the barriers to engagement and success by Indigenous students persist and are "relatively unchanged" (Pechenkina & Anderson, 2011, p. 8). The lack of a data quality framework and the persistence of data issues are clearly implicated in the relative failure of attempts to ameliorate this seemingly intractable concern.

It is essential that rigorous inquiry be carried out into data required or sought in the higher education sector on and for Aboriginal and Torres Strait Islander people. This inquiry must essentially involve Aboriginal and Torres Strait Islander people, researchers and communities. It would need to assume a collaborative approach with existing government and independent organisations, researchers from higher education institutions and practising Aboriginal and Torres Strait Islander researchers.

The core purpose of a culturally appropriate data quality framework

At its broadest level, a data quality framework might be seen as a conceptual map that allows statistics to be organised and grouped into a logical structure defining the scope of an inquiry and delineating the important concepts associated with a body of knowledge (Trewin, 2003, p. vi). Laux and Barham (2012) distinguish between "*conceptual frameworks*" that define a statistical domain, "*statistical frameworks"* that align users' needs with "classifications, methods and results", and "*quality frameworks*" that describe the "quality – relevance, accuracy, timeliness" of statistics (p. 2). With particular reference to education and training, Trewin (2003) points out that statistics come from a diverse range

of agencies (p. vi) that are independent and do not really see it as their business to pay attention to overlap or compatibility of their statistics. For example, there is not even agreement between the responsible data gathering agencies on the number of Aboriginal and Torres Strait Islander students undertaking higher education.

International models of data collection exist in other countries with Indigenous populations. The Māori Statistical framework (Statistics New Zealand, 2002) is often quoted as a model framework for Indigenous statistics because it engages Māori in identifying Māori needs for statistics, and elaborating a framework to meet such needs. It combines different levels and types of frameworks into one framework (Dandenau, 2008; Jordan et al., 2010; Rowse, 2009). The multidimensional framework is oriented towards Māori wellbeing and development, and incorporates Māori worldviews. The framework identifies "areas of concern" such as Māori language, Māori knowledge, modern knowledge and skills; "goal dimensions" such as empowerment and enablement; and related "measurement dimensions" for each goal (Wereta & Bishop, 2004, p. 9). Conversely, issues identified in Aboriginal data in Canadian education statistics indicate data incompatibilities and limitations such as small sample size of surveys, identification questions and small populations buried "beyond the asterisk" (Shotton, Lowe, & Waterman, 2012; Statistics Canada, 2009).

Other frameworks of significance are the United Nations Permanent Forum on Indigenous Issues (UNPFII) that developed indicators for Indigenous peoples' well-being, poverty and sustainability (Stankovitch, 2008), and the ABS Data Quality Framework (DQF) (ABS, 2011a) adopted by the COAG National Reporting Framework (Council of Australian Governments (COAG), n.d.). To measure Indigenous disadvantage in education and training, the Productivity Commission's *Overcoming Indigenous Disadvantage* (2011) used key indicators such as school attendance, enrolment, Year 9 attainment, Year 10 attainment, transition from school to work, teacher quality, and Indigenous cultural studies, although it acknowledged that the latter two could not be measured or quantified (p. 6.12). The ABS data quality framework drew on the seven dimensions applied by *Statistics Canada*'s quality

assurance framework (these being: institutional environment; relevance; timeliness; accuracy; coherence; interpretability; and, accessibility). It is noteworthy that these quality indicators are subject to contextual factors, and some may be more important (or impactful) than others, depending on the data type and proposed use:

Institutional environment

This dimension refers to the trustworthiness and credibility of the institution providing the data. Trewin (2002) emphasised this when he noted that, as consumers, we rely on the credibility and trust in the sources of the data. "The credibility could be challenged at any time on two primary grounds; because the statistics are based on inappropriate methodology, or because the office is suspected of political biases" (p. 1).

Relevance

How well do the data meet the need of the end user?

Timeliness

What is the time lag between the data reference point (the time the data refers to) and the data availability?

Accuracy

How well do the data measure what they purport to measure? This is a variant of validity.

Coherence

Are the data internally consistent and comparable across other sources of data?

Interpretability

What information is available to provide insight into the data?

Accessibility

There are two components to accessibility. The first is how easily can it be obtained and the second is the suitability of the form in which it may be obtained.

(ABS, 2011a; Allen, 2002; Gilbert, 2010)

One way forward towards improving data quality associated with Aboriginal and Torres Strait Islander higher education participation might be to layer these seven dimensions with more realistic, finely-grained, responsive, flexible, and culturally discursive elements. As Rowse (2009) points out, in the political discourse of statistics there are differences between using "population" as a measure and "people" with a shared culture and measured within a culturally specific framework.

Collectively, these elements might not only improve higher education data collection and data usage practices, but also contribute to better outcomes regarding access, participation and retention in higher education for Aboriginal and Torres Strait Islander students. It should be noted that the European Statistics code of practice (European Statistical System, 2011) referred to by the ABS Data Quality Framework (ABS DQF) European code document does not address Indigenous populations, thus is of limited value to the development of culturally appropriate data quality frameworks.

The World Indigenous Nations Higher Education Consortium (WINHEC), established in 2002, provides important guiding principles and goals for the development of a data quality framework for Aboriginal and Torres Strait Islander higher education statistics. These principles are strongly supportive of recognising and valuing cultural dimensions as key elements to academic success and Indigenous involvement, in the agreeing of definitions, interpretations and affirmations of success, and what it means to Indigenous peoples (Pers. Comm. 13/10/14), and are represented in Table 5. WINHEC's charter is expressed as follows:

> *We gather as Indigenous Peoples of our respective nations recognising and reaffirming the educational rights of all Indigenous Peoples. We share a vision of Indigenous Peoples of the world united in the collective synergy of self-determination through control of higher education. We are committed to building partnerships that restore and retain indigenous spirituality, cultures and languages, homelands, social systems, economic systems and self-determination.*

And its goals are to:

1. Accelerate the articulation of Indigenous epistemology (ways of knowing, education, philosophy, and research)
2. Protect and enhance Indigenous spiritual beliefs, culture and languages through higher education.
3. Advance the social, economic, and political status of Indigenous Peoples that contribute to the well-being of Indigenous communities through higher education.
4. Create an accreditation body for Indigenous education initiatives and systems that identify common criteria, practices and principles by which Indigenous Peoples live.
5. Recognize the significance of Indigenous education.
6. Create a global network for sharing knowledge through exchange forums and state of the art technology.
7. Recognize the educational rights of Indigenous Peoples.

Lessons may also be learnt from the evaluation of frameworks relating to Aboriginal and Torres Strait Islander peoples in the health arena including the Health Performance Framework (Australian Health Ministers' Advisory Council, 2012) and Indigenous wellbeing frameworks (Australian Bureau of Statistics, 2010a, 2012a; Australian Institute of Health and Welfare, 2009; Jordan et al., 2010; Steering Committee for the Review of Government Service Provision, 2011).

Principles developed for National Aboriginal and Torres Strait Islander Health data (NAGATSIHID, 2006) also might offer useful guidance. In particular:

Principle 1: The management of health-related information about Aboriginal and Torres Strait Islander persons must be ethical, meaningful, and support improved health and better planning and delivery of services.
Principle 2: The analysis, interpretation and reporting of Aboriginal and Torres Strait Islander health-related information should, where feasible, occur collaboratively with Aboriginal and Torres Strait Islander people.

A data quality framework will provide (at a minimum):

- The basis of a shared, culturally appropriate, critical statistical literacy to bridge the gap between interpretative / epistemic communities.

- An explicit accountability mechanism for dealing with
  - the naïve (developing data / statistical literacy)
  - the deceptive (National Standards and KPIs)
  - the scientific fallacies (education and critical thinking).

Towards the development of a culturally appropriate draft quality framework for Aboriginal and Torres Strait Islander higher education data and statistics

Some clear indicators towards the development of guiding principles have emerged from the above review. A culturally appropriate data quality framework should address (at least) the following:

- Name, interrogate and challenge the cultural insensitivity and inherent "whiteness" of many current practices (Naïve Fallacy).
- Avoid the "one-size-fits-all" solution (Broadbent, 2004). Remain aware of initiatives in which progress is "far too subtle and context specific to be amenable to global targets" (p. 4).
- Focus on success indicators as well as failure indicators as part of a commitment to developing strengths-based narrative in the higher education experience of Aboriginal and Torres Strait Islander peoples.
- Related to the previous point—name, interrogate and challenge the small and large "P" political context of data collection, interpretation and use (Deceptive Fallacy).
- The need for agreed standards on reporting. The ABS has a lead role in this respect.
- What Allen (2002) described as the need for quality management in data services where quality is defined as data that is "fit for purpose" (p. 1) (Scientific Fallacy).

- The importance of remaining aware of the distinctiveness of context (Naïve Fallacy).
- Not promulgating homogenisation of Indigenous experience/culture in pursuit of standardisation (Naïve /Deceptive Fallacy).
- Agreed definitions. There is a need for an agreed standard question or approach to ascertaining Indigenous identification to enhance consistency and comparability across jurisdictions and sectors. It is also important to have articulated processes to follow if a student does not want to answer such questions (Allbon & Trewin, 2006) (Scientific Fallacy).
- Continuing professional development to enhance shared statistical literacy (Naïve, Deceptive, Scientific Fallacy).

The following table sets out our proposal for a draft data quality framework, informed by these principles, inspired by our consultations with senior Indigenous and non-Indigenous academics and bureaucrats, researchers, and other stakeholders, and with reference to international movements and frameworks associated with Indigenous higher education.

Table 5: Draft Quality Framework for Aboriginal and Torres Strait Islander Higher Education Data and Statistics[8]

Purposes: Recognising the importance of Indigenous terms of reference to data quality	
What are the principles that could underpin the development of a data quality framework?	***Article 23 of the UN Declaration on the Rights of Indigenous People*** Indigenous peoples have the right to determine and develop priorities and strategies for exercising their right to development. In particular, Indigenous peoples have the right to be actively involved in developing and determining health, housing and other economic and social programmes affecting them and, as far as possible, to administer such programmes through their own institutions.

[8] Associated Documents and Protocols

The Māori Statistical framework (Statistics New Zealand, 2002): WINHEC protocols and gudelines: The United Nations Permanent Forum on Indigenous Issues (UNPFII) (Stankovitch, 2008). Statistics Canada; The ABS Data Quality Framework (DQF) (Australian Bureau of Statistics, 2011a); The COAG National Reporting Framework (Council of Australian Governments (COAG), n.d.); European Statistics code of practice (European Statistical System, 2011); Aboriginal and Torres Strait Islander Health Performance Framework

		WINHEC Goals • An acceleration of the articulation of Indigenous epistemology (ways of knowing, education, philosophy and research) • The protection and enhancement of Indigenous spiritual beliefs, culture and languages through higher education • Advancement of the social, economic and political status of Indigenous peoples that contribute to the well-being of Indigenous communities through higher education • The recognition of the significance of Indigenous education • The recognition of the educational rights of Indigenous peoples _____ ***Other*** The valuing and privileging of Indigenous knowledge, voices and perspectives A strengths-based, future orientation Sustainable – able to withstand changes in government (Pers. Comm.) Demonstrable community benefit—outcomes concerning needs which have been articulated by, and are relevant to, Indigenous communities. Appropriateness and sensitivity of data to cultural / community concerns. Making data available at the level needed by Indigenous communities (Biddle, 2014) Relational, not hierarchical (Andersen, Bunda, & Walter, 2008). Benefits and returns are seen by the people about whom the data is collected. Reciprocity. (Pers. Comm)
In what ways might a data quality framework strengthen higher education governance processes?	Lessons from the Health Sector for the higher education sector	• Linking of data quality processes to robust goals and strategy • The setting of priorities and targets • The development of a national approach • The cultivation of a shared statistical literacy across the sector • Benchmarking of outcomes • The development of success indicators • Improved policy analysis and evaluation • Performance management and review
	Collection of statistics with a higher-order purpose	• For example The Māori Statistical Framework that identifies Māori needs for statistics and the aligning of “goal dimensions” and “measurement dimensions”, chiefly to promote wellbeing • Viewing participation in higher education by Aboriginal and Torres Strait Islander students as key to social inclusion (Pechenkina and Anderson, 2011) • Oversighting of the data collection process in higher education linked to clear goals and priorities • A clear rationale for why the data is needed/collected (Pers. Comm.)

	Recognition of multiple and intersecting communities of interest	• Professionals (demographers, statisticians, social scientists, researchers) • Bureaucrats and administrators • Higher education leadership and governance • Lay community (Indigenous and non-Indigenous)

Ensuring cultural appropriateness, community responsiveness, quality, and equity in data collection practices in higher education	
Elements to promote data consistency	• Recognition of the cultural dimensions of statistical literacy—recognising cultural knowledge, worldviews, customs and practices • Agreed-upon, sector wide standards of reporting • Professional development to promote a shared statistical literacy across the sector • Self-identification—understanding that this can vary across time, locations and contexts and will impact on data quality and data collection • Peer review of technical specification
Elements to promote data completeness	• Develop data quality statements for datasets and don't report data that are not reliable and valid for Indigenous Australians (Pers.Comm.) • Training of local community members to gather data according to high standards of research practice (Taylor et al., 2012) • Understanding and factoring in the impacts of self identification practices • The role of the sector in the training and support of Indigenous quantitative researchers (Biddle, 2014)
Data collection methods	Culturally appropriate data collection methods – collection of statistics through a 'dual lens'
Data definitions	Agreed definitions – dictionary of higher education data terms to improve the capacity of the sector to, among other things, evaluate program performance, link data, produce quality comparative data, and undertake benchmarking
Data levels of analysis	The appropriate level of measurement: individual vs group vs sector

Ensuring cultural appropriateness in data use, availability and management	
Data Availability	Online access. Timeliness of reporting.
Data type	Recognising the value that qualitative data can add to quantitative
Data standards	Quality of indicators – • Reliability and validity • Sampling • Sample size
Data storage and security	Ownership and stewardship of data

Data Determinism	A strategic, agreed-upon and informed approach to data collection.
Capturing data over time	• Linking of cross-sectional data • Collection of longitudinal data

Summary

The overarching goals in the development of a data quality framework for Aboriginal and Torres Strait Islander data and statistics are to develop a greater and more sophisticated shared statistical literacy among the diverse stakeholder groups in order to support culturally appropriate and data-informed decision making nationally in the sector.
This will require four essential components:

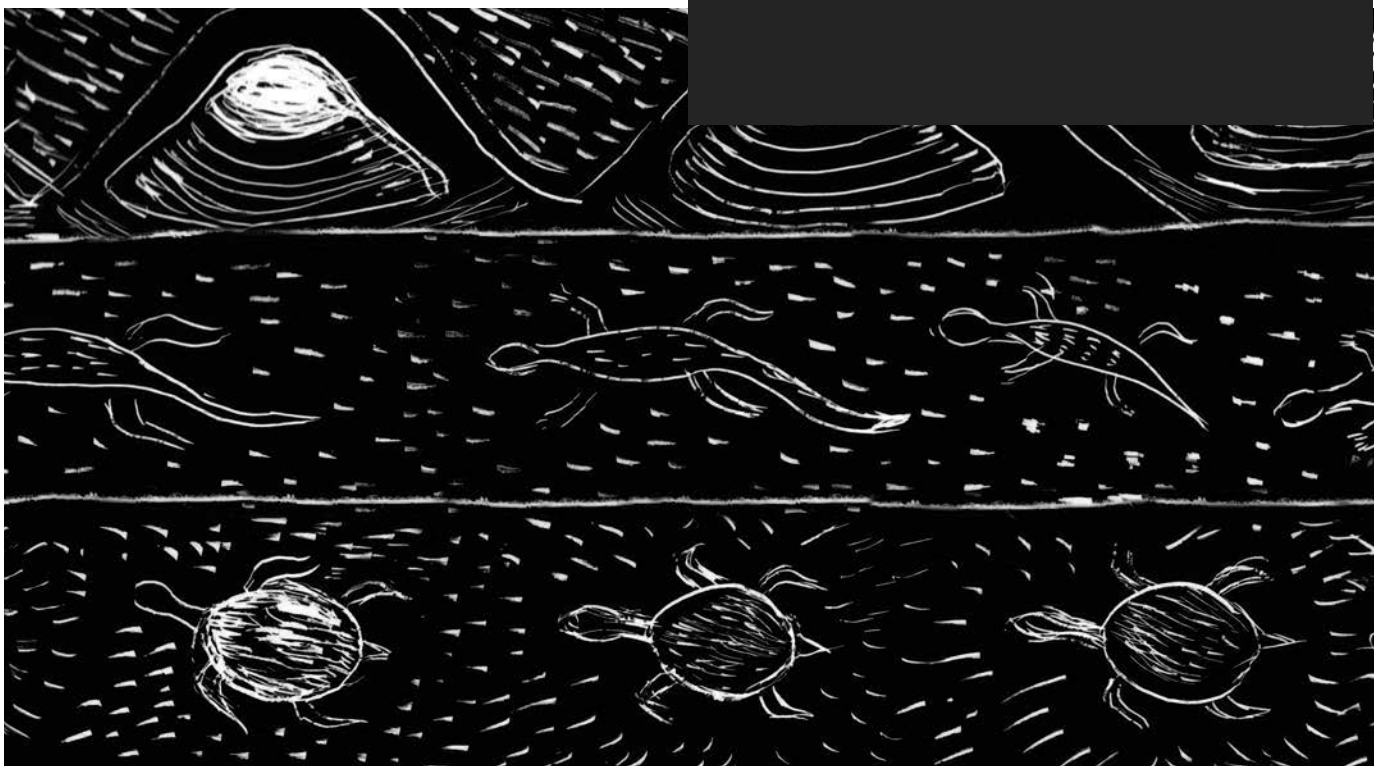
1. A deeper understanding of the issues that impact on data quality in the sector.
2. A national commitment to culturally competent and safe practices in the development, collection, interpretation and use of Indigenous higher education statistics.
3. A shared and agreed understanding of key indicators and their collection, interpretation and application.
4. A national sectoral commitment to unmask and name issues that serve to obfuscate and politicise understanding of Indigenous engagement in higher education with the (mis)use of statistics and data.

We have argued what we believe is a compelling case for such a data quality framework to inform decision making at all levels, and have laid out the elements of a suggested framework. We emphasise the importance of integrating cultural dimensions and culturally appropriate practice within a critically responsive intercultural space that capitalises on the opportunities for reflection utilising the dual lens. A key goal is to seek the establishment of a shared, culturally appropriate, statistical literacy to enhance “experience near”. Further, strong principles based on the articulated goals, objectives, outcomes, and desires of Aboriginal and Torres Strait Islander peoples in relation to higher education, provide the foundations for a successful framework. As discussed, these include: Indigenous

identification of needs; agreement on appropriate indicators; the incorporation of Indigenous worldviews; recognition of the diversity and uniqueness of Indigenous peoples; the current limitations on Indigenous agency; respect for Indigenous knowledge, practices and innovations; and consideration of variations in definitions and terminology across different geographic areas and among peoples (Australian Institute of Aboriginal and Torres Strait Islander Studies, 2012; Nakata, 2007; Walter, 2010; Walter & Andersen, 2013).

In the next section, we move into a discussion on data dictionaries. We provide a brief introduction to the definition and purpose of a data dictionary; compare the AIHW example and HEIMS example of data consistency; propose definitions and support for data collectors and users; and outline considerations for improving and further developing a National Higher Education Data Dictionary with a focus on Aboriginal and Torres Strait Islander data.

Part Two



Culturally Appropriate Quality Indicators Associated with the Aboriginal and Torres Strait Islander Elements of a Data Dictionary in Higher Education

Overview

The Phillips KPA Report (2012), recommended developing the existing HEIMS Data Elements section into an effective and comprehensive data dictionary. Following this recommendation, an examination of the literature on data dictionaries highlighted the paucity of exemplars and of research on the development or best practice of higher education data dictionaries. Most of the research in this area was recent and identified the lack of central data repositories as well as a need for a comprehensive data dictionary that will provide clear, consistent, shared meanings for data elements across the higher education sector (Hamblin & Phoenix, 2012; Phillips KPA, 2012; Common Education Data Standards, 2013; Biddle, 2014). However, as emphasised in Part 1, what is more concerning is that recent literature has also brought to attention the significant lack of governance in terms of guidelines for the establishment, collection, definitions and interpretation of data on and for Aboriginal and Torres Strait Islander people, particularly in the higher education sector.

The diversity within Aboriginal Torres Strait Islander culture, language, location and way of living, together with the historical context of data collection, brings many complexities to the establishment, gathering, defining and interpretation of data (Walter, 2010; Biddle, 2014). Much data on and for Aboriginal and Torres Strait Islander people is misinterpreted and misused. Because of this, the stringent governance of data, and a specific focus on data for Aboriginal and Torres Strait Islander people, are imperative to developing relevant, consistent data sets with shared understandings and which address the unique needs and aspirations of Aboriginal and Torres Strait Islander people. Accordingly, the development of elements for a data dictionary to capture the needs and perspectives of Aboriginal and Torres Strait Islander people, is required.

Identifying a collection of exemplar data dictionaries in the higher education sector proved quite difficult as the majority of literature on data dictionaries was focused on science based areas and in particular, the health sector. Comparing the literature on data quality (International Standards Organization, 2004; PREMIS Working Group, 2005; National Forum on Education Statistics, 2009; Phillips KPA, 2012) with the background and structure of health sector data repositories, the Australian Institute of Health and Welfare (2013a) emerged as an exemplar of merit with its metadata online registry and data dictionary, METeOR.

Definition

A data dictionary is "an agreed-upon set of clearly and consistently defined elements, definitions, and attributes—and is indispensable to any information system" (National Forum on Education Statistics, 2009, p.15). A data dictionary provides (AHIMA, 2012):

- A descriptive list of names (data elements)
- Definitions
- Expected meanings and acceptable representation of data within a context of a data set
- Metadata – attributes of data elements.

Purpose

Having a data dictionary in the higher education sector is crucial to ensuring correct use and interpretation of data within and across the sector. The need for accurate data and data definitions is significant. Data requirements, contexts and understandings are constantly evolving (Northwest Environmental Data-Network, 2006; Hamblin & Phoenix, 2012; Common Education Data Standards, 2013) and particular emphasis is made on the important role of quality and consistent metadata.

> "Metadata are structured information that describes (sic), explains (sic), locates (sic), or otherwise makes (sic) it easier to retrieve, use, or manage an information

> resource… a robust metadata system improves the accuracy of data use and interpretation, as well as the efficiency of data access, transfer, and storage." (National Forum on Education Statistics, 2009, p.15)

Comparison of Higher Education and Health Sector Data Information

The Higher Education Information Management System (HEIMS) is a national system that provides information about reporting requirements, procedures and data element information for higher education and Vocational Education and Training (VET) providers. The Australian Institute of Health and Welfare (AIHW) provides extensive evidence and guidelines in the area of data governance, collection guidelines, links across data sets and collections across related sectors, an information repository in the health sector, and a comprehensive data dictionary (METeOR) (AIHW, 2013a).

Table 6 compares the two systems by outlining the function and supporting information in relation to data elements provided by the AIHW repository website and HEIMS website. The websites differ in terms of function, the supporting information of the data dictionaries, and data quality standard.

Table 6: Function and supporting information in relation to data elements provided by the AIHW repository website and HEIMS website

Description	AIHW / METeOR and National Health Data Dictionary	HEIMS/ HEIMS Data Elements
Functions	National Registry that provides an up-to-date source of data standards across health, community services and housing assistance sectors.	National organisation that provides information about reporting requirements and procedures for higher education and VET providers.
	Integrates and presents information on data across the health, community services and housing assistance and other related data collection organisations.	National reporting body for higher education and VET providers. No evidence regarding links to data sets between other higher education data collection and information repositories (Department of Education and Training, TEQSA).
Focus of Development	Developed to provide consistent, reliable, comprehensive data sets, data elements, metadata standards and collection guidelines for collection and usage of data across the health, community services and housing assistance sectors.	Developed to provide guidelines for data and reporting procedures for universities to meet obligations under the Higher Education Support Act 2003 (HESA), for TEQSA and the Commonwealth Scholarships assistance.
Data Sets	Links data sets across sectors.	No evidence of linked data sets across sectors.
Supporting Evidence and Literature	Evidence and literature (located on the website) on the development of the data governance, data dictionary, best practice in data quality and best practice for collecting Indigenous status in health data sets.	No evidence. Mainly systems and software to check, validate, revise and verify data according to reporting requirements.
Definitions	Detailed explanations and definitions of all aspects of the metadata, including visual representations including diagrams and flow charts.	Limited explanations and definitions of all aspects of the metadata. A lack of visual representations. Has a link to a glossary; however the definitions do not elaborate on the meanings of the data elements.
Indigenous Data Guidelines	AIHW section dedicated to 'Indigenous statistics: quality and availability' further informs METeOR users. Includes best practice guidelines for the collection of Indigenous data.	No section in regards to Indigenous statistics or data.
Metadata	Comprehensive and detailed metadata/attributes of data elements in the data dictionary.	Limited metadata/attributes of data elements in the data dictionary.

Comparison of metadata in Table 7 brings attention to the limited information currently provided by the metadata in the HEIMS example[9]. Detailed metadata are crucial in the provision of clear definitions, accurate collection and usage, attributes and interpretation of data elements. To further examine the standard and quality of definitions, Table 7 lists specific metadata provided by the AIHW data dictionary and the HEIMS data dictionary.

Table 7: Breakdown of metadata details in AIHW National Health Data Dictionary and HEIMS Data Elements

	AIHW National Health Data Dictionary	**HEIMS Data Elements**
Metadata Provided	Data Dictionary - Data element item attributes: Identifying and definitional attributes Object class name (data element item) Technical name Synonymous names (when required) METeOR identifier (code number) Registration status Definition Data element concept Value domain attributes Representational Attributes Data element attributes Collection and usage attribute (guide for use) Collection and usage attribute (collection methods) Source and reference attributes Submitting organization Steward Origin Reference documents Relational attributes Related metadata references Data element concepts implementing this object class	Data Dictionary—Data element item attributes: Description Details Version First year Last year Field name Element name Code format Classification—codes and subcategories of data element item Coding notes (has link to HEIMS glossary) Input Change History

[9] The Department of Education and Training, under the guidance of the Higher Education Data Committee (HEDC), is undertaking a four-year project that includes further developmental work on the HEIMS Data Elements Dictionary. This work is being undertaken in response to recommendations in the Phillips KPA review (2012)

To better understand the nature and purpose of the metadata, an example of the Indigenous status identifier data element from the AIHW data dictionary and the Aboriginal and Torres Strait Islander identifier from HEIMS data element dictionary is illustrated below (Figures 1 and 2).

Figure 1: Example of AIHW Identification Data Element for Aboriginal and Torres Strait Islander people (Source: Australian Institute of Health and Welfare):

Person—Indigenous status, code N

Identifying and definitional attributes

Metadata item type:	Data Element
Short name:	Indigenous status
METeOR identifier:	291036
Registration status:	Community Services, Standard 25/08/2005 Housing assistance, Standard 15/04/2010 Health, Standard 04/05/2005 Early Childhood, Standard 21/05/2010 Homelessness, Standard 23/08/2010 Tasmanian Health, Final 30/06/2014 WA Health, Endorsed 04/03/2014 Independent Hospital Pricing Authority, Standard 01/11/2012 Indigenous, Endorsed 11/09/2012
Definition:	Whether a person identifies as being of Aboriginal or Torres Strait Islander origin, as represented by a code. This is in accord with the first two of three components of the Commonwealth definition.
Data Element Concept:	Person—Indigenous status

Value domain attributes

Representational attributes

Representation class:	Code
Data type:	Number
Format:	N
Maximum character length:	1

Permissible values:

Value	Meaning
1	Aboriginal but not Torres Strait Islander origin
2	Torres Strait Islander but not Aboriginal origin
3	Both Aboriginal and Torres Strait Islander origin
4	Neither Aboriginal nor Torres Strait Islander origin

Supplementary values:

9	Not stated/inadequately described

Collection and usage attributes

Guide for use: This metadata item is based on the Australian Bureau of Statistics (ABS) standard for Indigenous status. For detailed advice on its use and application please refer to the ABS Website as indicated in the Reference documents.

The classification for Indigenous status has a hierarchical structure comprising two levels. There are four categories at the detailed level of the classification which are grouped into two categories at the broad level. There is one supplementary category for 'not stated' responses. The classification is as follows:

Indigenous:

- Aboriginal but not Torres Strait Islander origin.
- Torres Strait Islander but not Aboriginal origin.
- Both Aboriginal and Torres Strait Islander origin.

Non-Indigenous:

- Neither Aboriginal nor Torres Strait Islander origin.

Not stated/ inadequately described:

This category is not to be available as a valid answer to the questions but is intended for use:

- Primarily when importing data from other data collections that do not contain mappable data.
- Where an answer was refused.
- Where the question was not able to be asked prior to completion of assistance because the client was unable to communicate or a person who knows the client was not available.

Only in the last two situations may the tick boxes on the questionnaire be left blank.

Data element attributes

Collection and usage attributes

The standard question for Indigenous Status is as follows:

[Are you] [Is the person] [Is (name)] of Aboriginal or Torres Strait Islander origin?

(For persons of both Aboriginal and Torres Strait Islander origin, mark both 'Yes' boxes.)

No.....

Yes, Aboriginal.....

Collection methods:

Yes, Torres Strait Islander.....

This question is recommended for self-enumerated or interview-based collections. It can also be used in circumstances where a close relative, friend, or another member of the household is answering on behalf of the subject. It is strongly recommended that this question be asked directly wherever possible.

When someone is not present, the person answering for them should be in a position to do so, i.e. this person must know well the person about whom the question is being asked and feel confident to provide accurate information about them.

This question must always be asked regardless of data collectors' perceptions based on appearance or other factors.

The Indigenous status question allows for more than one response. The procedure for coding multiple responses is as follows:

If the respondent marks 'No' and either 'Aboriginal' or 'Torres Strait Islander', then the response should be coded to either Aboriginal or Torres Strait Islander as indicated (i.e. disregard the 'No' response).

If the respondent marks both the 'Aboriginal' and 'Torres Strait Islander' boxes, then their response should be coded to 'Both Aboriginal and Torres Strait Islander Origin'.

If the respondent marks all three boxes ('No', 'Aboriginal' and 'Torres Strait Islander'), then the response should be coded to 'Both Aboriginal and Torres Strait Islander Origin' (i.e. disregard the 'No' response).

This approach may be problematical in some data collections, for example when data are collected by interview or using screen based data capture systems. An additional response category

Yes, both Aboriginal and Torres Strait Islander...

may be included if this better suits the data collection practices of the agency or establishment concerned.

Comments: The following definition, commonly known as 'The Commonwealth Definition', was given in a High Court judgement in the case of Commonwealth v Tasmania (1983) 46 ALR 625.

'An Aboriginal or Torres Strait Islander is a person of Aboriginal or Torres Strait Islander descent who identifies as an Aboriginal or Torres Strait Islander and is accepted as such by the community in which he or she lives'.

There are three components to the Commonwealth definition:

- descent;
- self-identification; and
- community acceptance.

In practice, it is not feasible to collect information on the community acceptance part of this definition in general purpose statistical and administrative collections and therefore standard questions on Indigenous status relate to descent and self-identification only.

Source and reference attributes

Origin: National Health Data Committee

National Community Services Data Committee

Reference documents: Australian Bureau of Statistics 1999. Standards for Social, Labour and Demographic Variables. Cultural Diversity Variables, Canberra. Viewed 3 August 2005.

Relational attributes

Supersedes Person—Indigenous status, code N Community Services, Superseded 25/08/2005, Health, Superseded 04/05/2005

See also Service provider organisation—number of Indigenous children attending a preschool program, total number N[NNNN] Early Childhood, Superseded 28/05/2014, Indigenous, Endorsed 11/09/2012

See also Service provider organisation—number of Indigenous children attending an early childhood education program, total number N[NNNN] Early Childhood, Standard 28/05/2014, Indigenous, Draft 17/12/2013

Related metadata references: i

See also Service provider organisation—number of Indigenous children enrolled in a preschool program, total N[NNNN] Early Childhood, Superseded 28/05/2014, Indigenous, Endorsed 08/04/2013

See also Service provider organisation—number of Indigenous children enrolled in a preschool program, total N[NNNN] Early Childhood, Superseded 08/04/2013, Indigenous, Archived 08/04/2013

See also Service provider organisation—number of Indigenous children enrolled in an early childhood education program, total N[NNNN] Early Childhood, Standard 28/05/2014, Indigenous, Draft 17/12/2013

Implementation in Data Set Specifications: i

All attributes +

Aboriginal and Torres Strait Islander primary health-care services client numbers cluster Indigenous, Endorsed 16/09/2014

DSS specific attributes +

Aboriginal and Torres Strait Islander primary health-care services episodes of care cluster Indigenous, Endorsed 16/09/2014

(Note: this list is extensive)

Implementation in Indicators: i

Used as numerator

Indigenous primary health care: PI01a-Number of Indigenous babies born within the previous 12 months whose birth weight has been recorded, 2012 Health, Superseded 22/02/2012

(Note: this list is extensive)

Figure 2: Example of HEIMS Identification Data Element for Aboriginal and Torres Strait Islander people, from 2015 draft Data Requirements (Source: Department of Education and Training, 2014):

316 Aboriginal and Torres Strait Islander code

Description

A code which identifies whether or not the student/applicant identifies herself or himself as being of Aboriginal and/or Torres Strait Islander descent.

Details

Version: 6.0

First year: 2015

Last year: -

Field name: ABORIG-TORRES

Element name: Aboriginal and Torres Strait Islander code

Code format:

Data Type: Numeric

Units: Code (numeric)

Width: 1

Classification

CODE	MEANING
2	Non indigenous – neither Aboriginal nor Torres Strait Islander origin
3	Of Aboriginal origin but not Torres Strait Islander
4	Of Torres Strait Islander origin but not Aboriginal
5	Both Aboriginal and Torres Strait Islander origin
9	No information

Coding notes

Applications and Offers only

HEPs / TACs - data is required in all submissions.

For TACs refer to TAC Data Elements Map for more information.

Please refer to the Glossary for further information about terminology used in this document.

Input files

Higher Education Student:

- Student Enrolment (EN)
- Enrolment Revisions (ER)
- Past Course Completions (PS)

Higher Education Staff:

- Full-time and Fractional Full-time (FT)

University Applications and Offers:

- Application Details (AD)

VET Student:

- Student Enrolment (VEN)
- VET Enrolment Revisions (VER)

Change History

Details of all versions of this data element can be found on its supporting information page.

Examination of the data element examples from the AIHW National Data Dictionary and the HEIMS Data elements dictionary revealed a lack of metadata to define data elements in the HEIMS dictionary. Detailed metadata are essential for accurate and consistent definitions of data elements. This is particularly significant for data elements relating to Aboriginal and Torres Strait Islander people. Data elements such as school "attendance" (Prout, 2010) and "household" (Morphy, 2006) may have different connotations in the Aboriginal and Torres Strait Islander context as compared with non-Indigenous contexts. These differences should be apparent in data element definitions to ensure the appropriate collection, usage and interpretation of the data. For example, data elements such as "Indigenous identity" may be referred to and understood using different terminology (Biddle, 2014), and can be clarified in the metadata. Clear and comprehensive metadata can place data elements into context resulting in a more accurate understanding of the data element. The AIHW example also includes guides for data collection and usage which is a mechanism for assuring data quality.

Developing an Aboriginal and Torres Strait Islander Data Set within a National Higher Education Data Dictionary

A set of standards and data quality guidelines are required for the development of a framework for a data dictionary to enable consistency and shared meanings of data elements. The Department of Education and Training, under the guidance of the Higher Education Data Committee (HEDC), is undertaking a four-year project that includes further developmental work on the HEIMS Data Elements Dictionary. This work is being undertaken in response to recommendations in the Phillips KPA review (2012).

It is suggested that the HEIMS data dictionary be expanded to include:

- A focus on the Aboriginal and Torres Strait Islander data elements.
- Clear links to HEIMS data dictionary between collection repositories (e.g. Australian Bureau of Statistics, the Department of Education and Training, Australian Data

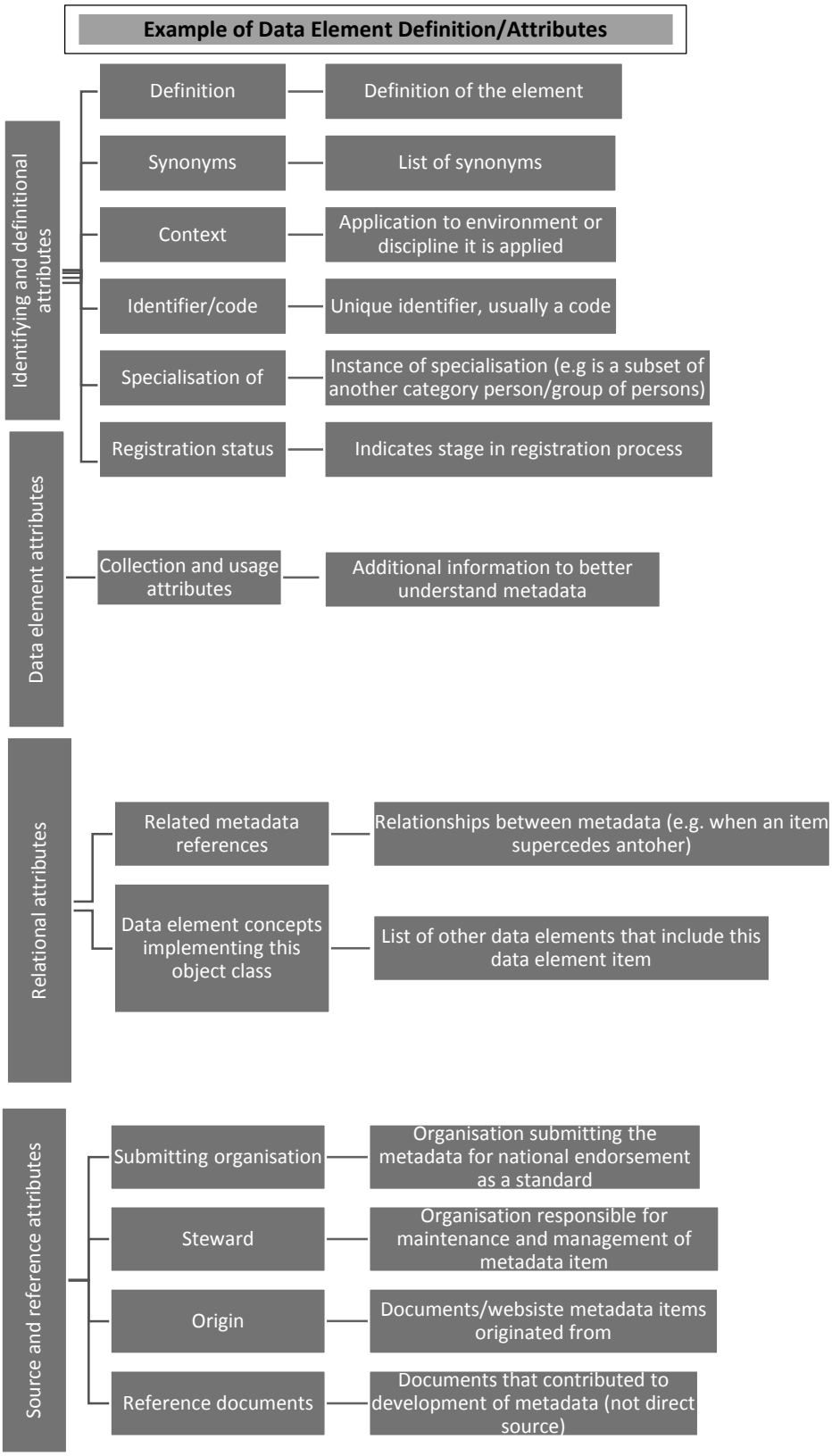
Archive), information repositories (e.g. TEQSA, HEIMS) and higher education institutions.

- Expanded metadata in HEIMS data elements to provide comprehensive, clear, consistent definitions and meanings of data elements.
- Thorough explanations of data elements with detailed metadata. (Refer Figure 3)

A suggested approach to developing an Aboriginal and Torres Strait Islander educational data set includes:

- The creation of a systematic national approach and best practice guidelines for the establishment, collection, recording, usage, definitions and interpretation of data on and for Aboriginal and Torres Strait Islander peoples.
- Collaboration with Aboriginal and Torres Strait Islander peoples to investigate data needs and develop best practice guidelines for the establishment, collection, recording, usage, definitions and interpretation of data on and for Aboriginal and Torres Strait Islander peoples.
- Ensuring that perspectives, aspirations, needs and standpoints of Aboriginal and Torres Strait Islander peoples are embedded in the establishment, definitions, usage and interpretation of data on and for Aboriginal and Torres Strait Islander peoples (Jordan, Bulloch, & Buchanan, 2010; Biddle, 2014).

Figure 3: Framework for data element attributes/metadata adapted from METeOR National Health Data Dictionary and NHI Data Dictionary



Conclusion

In this discussion paper we have considered a number of issues, assumptions, complexities, and possible approaches to improving Aboriginal and Torres Strait Islander data and statistics in higher education. Part 1 outlined the context for improving data quality as it relates to Aboriginal and Torres Strait Islander higher education, considering some specific statistical and data quality issues with reference to upstream, midstream and downstream elements. A number of significant data quality issues were identified, including a range of cultural dimensions and contexts which are absent from current guidelines including the ABS Quality Data Framework and the HEIMS. A draft, culturally-appropriate data quality framework was proposed, guided by existing frameworks and principles including the Māori Statistical framework, the WINHEC protocols and guidelines and the UNPFII. Part 2 defined and discussed the purpose of a data dictionary, as well as the importance of metadata. A health sector (AIHW) and a higher education sector (HEIMS) data information system were compared for their function, supporting information, data quality standards and use of metadata, revealing broad differences in the two. Finally, Part 2 summarised the key elements that may inform the development of an Aboriginal and Torres Strait Islander data set within a National Higher Education Data Dictionary.

The above elements have been brought together with the intention of beginning a discussion about how to mitigate the challenges that exist in the field of Aboriginal and Torres Strait Islander data and statistics in higher education settings. A continuation of this important conversation throughout the sector, with subsequent measures being put in place could make a significant contribution to the wider and important goal of instilling culturally appropriate and responsive policies, practices and procedures across the sector.

References

Adelman, C. (2010). Turning around international comparative indicators. *New England Journal of Higher Education,* 2.

Allbon, P., & Trewin, D. (2006). *Recent developments in the collection of Aboriginal and Torres Strait Islander health and welfare statistics 2005*. AIHW cat. no. IHW 15; ABS cat. no. 4704.0.55.00. Canberra, ACT: AIHW and ABS.

Allen, B. (2002). *Qualifying quality: A framework for supporting quality-informed decisions*. Paper presented at the Proceedings of the Statistics Canada Symposium. http://unstats.un.org/unsd/dnss/docs-nqaf/ABS_Refernce_Papers.pdf

American Health Information Management Association [AHIMA]. (2012). "Managing a Data Dictionary." *Journal of AHIMA* (83), 1 148-52. Retrieved from http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_049331.hcsp?dDocName=bok1_049331

Andersen, C., Bunda, T., & Walter, M. (2008). Indigenous higher education: The role of universities in releasing the potential. *Australian Journal of Indigenous Education, 37*, 1-8. Australia. Department of Education. (2013). *Government response to the review of reporting requirements for universities.* Retrieved from https://www.education.gov.au/government-response-review-reporting-requirements-universities

Australian Bureau of Statistics. (2010a). *Framework for measuring wellbeing: Aboriginal and Torres Strait Islander peoples, Cat no. 4703.0.* Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/mf/4703.0

Australian Bureau of Statistics. (2010b). *A guide for using statistics for evidence based policy, Cat no. 1500.0* Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/lookup/1500.0chapter32010

Australian Bureau of Statistics. (2010c). *National Aboriginal and Torres Strait Islander Social Survey (NATSISS)*. Retrieved from http://www.abs.gov.au/Ausstats/abs@.nsf/

Australian Bureau of Statistics. (2011a). *The ABS Data Quality Framework (ABS DQF).* Retrieved from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/Quality:+The+ABS+Data+Quality+Framework

Australian Bureau of Statistics. (2011b). *Schools, Australia, 2010.* Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/mf/4221.0

Australian Bureau of Statistics. (2012a). *Aboriginal and Torres Strait Islander wellbeing: A focus on children and youth. Cat no. 4725.0.* Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4725.0Chapter120Apr%202011

Australian Bureau of Statistics. (2012b). *Information paper: Perspectives on Aboriginal and Torres Strait Islander identification in selected data collection contexts. Cat no. 4726.0.* Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4726.0Chapter72012

Australian Bureau of Statistics. (2013a). *Statistical language: What is metadata?* Retrieved from http://www.abs.gov.au/websitedbs/a3121120.nsf/home/statistical+language+-+what+is+metadata

Australian Bureau of Statistics. (2013b). *Information Paper: Census of Population and Housing 2011.0.55.001.* Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/lookup/2011.0.55.001Main%20Features802011

Australian Bureau of Statistics. (2014). *Information paper: Review of the Indigenous status standard. Cat no. 4733.0*. Retrieved from

http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/4733.0Main%20Features72014?opendocument&tabname=Summary&prodno=4733.0&issue=2014&num=&view=

Australian Commission on Safety and Quality in Health Care. (2014). *National Statement on Health Literacy.* Retrieved from http://www.safetyandquality.gov.au/publications/health-literacy-national-statement/

Australian Government. (2013). *Government response to the review of reporting requirements for universities.* Retrieved from http://docs.education.gov.au/system/files/doc/other/government_response_to_review_of_reporting_requirements_for_universities.pdf

Australian Health Ministers' Advisory Council. (2012). *Aboriginal and Torres Strait Islander Health Performance Framework 2012 Report*. Canberra, ACT: Australian Health Ministers' Advisory Council.

Australian Indigenous HealthInfonet. (2014). *Health overview 2014*. Retrieved from http://www.healthinfonet.ecu.edu.au/health-facts/overviews

Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). (2012). *Guidelines for Ethical Research in Australian Indigenous Studies (GERAIS).* Revised second edition. Retrieved from http://www.aiatsis.gov.au/research/docs/GERAIS.pdf

Australian Institute of Health and Welfare & Australian Bureau of Statistics. (2006). *Recent developments in the collection of Aboriginal and Torres Strait Islander health and welfare statistics 2005.* (Vol. AIHW cat. no. IHW 15; ABS cat. no. 4704.0.55.001.). Canberra, ACT: AIHW & ABS.

Australian Institute of Health and Welfare. (2009). *Measuring the social and emotional wellbeing of Aboriginal and Torres Strait Islander peoples*. Canberra, ACT: Australian Institute of Health and Welfare.

Australian Institute of Health and Welfare. (2012). *National health data dictionary [version 16].* Retrieved from http://www.aihw.gov.au/publication-detail/?id=10737422826

Australian Institute of Health and Welfare. (2013a). *METeOR: Metadata Online Registry.* Retrieved from http://meteor.aihw.gov.au/content/index.phtml/itemId/181162

Australian Institute of Health and Welfare. (2013b). *Indigenous statistics: quality and availability.* Retrieved from http://www.aihw.gov.au/indigenous-statistics-quality-availability/

Australian Institute of Health and Welfare. (2013c). *National best practice guidelines for collecting Indigenous status in health data sets.* Retrieved from http://www.aihw.gov.au/publication-detail/?id=6442468342

Behrendt, L., Larkin, S., Griew, R., & Kelly, P. (2012). *Review of higher education access and outcomes for Aboriginal and Torres Strait Islander people: Final report* (A. Government Ed.). Canberra, ACT: Department of Industry, Innovation, Science, Research and Tertiary Education.

Biddle, N., & Yap, M. (2010). *Demographic and socioeconomic outcomes across the Indigenous Australian lifecourse: Evidence from the 2006 census.* Retrieved from http://caepr.anu.edu.au/Publications/research-monographs/2010RM31.php

Biddle, N., & Cameron, T. (2012). Potential factors influencing Indigenous education participation and achievement. Adelaide, SA: NCVER.

Biddle, N. (2014). *Data about and for Aboriginal and Torres Strait Islander Australians: Issues paper no. 10 prepared for the Closing the Gap Clearinghouse*. Retrieved from http://www.aihw.gov.au/closingthegap/

Bonaccorsi, A., Daraio, C., Lepori, B., & Slipersæter, S. (2007). Indicators on individual higher education institutions: Addressing data problems and comparability issues. *Research Evaluation, 16*(2), 66-78. doi:10.3152/095820207x218141

Brent, G., & Rogers, A. (2008). *Sample design issues for national surveys of the Indigenous population*. Canberra, Australia: Australian Bureau of Statistics.

Broadbent, P. (2004). 'Lies, damned lies and statistics!': Three fallacies of comparative methodology [Editorial]. *Comparative Education, 40*(1), 3-6. doi: 10.1080/0305006042000184845

COAG Reform Council. (2012). *Indigenous Reform 2010-11: Comparing reform across Australia*. Sydney, NSW: COAG Reform Council Retrieved from http://www.coagreformcouncil.gov.au/reports/indigenous-reform/indigenous-reform-2010-11-comparing-performance-across-australia

COAG Reform Council. (2013). *Indigenous reform 2011–12: Comparing performance across Australia*. Sydney, NSW: COAG Reform Council Retrieved from http://www.coagreformcouncil.gov.au/reports/indigenous-reform/indigenous-reform-2011-12-comparing-performance-across-australia

Coase, R. (1981). *How should economists choose*? Washington, DC: American Enterprise Institute for Public Policy Research.

Common Education Data Standards. (2013). *The status of state data dictionaries.* Retrieved from https://ceds.ed.gov/pdf/status-of-state-data-dictionaries.pdf

Council of Australian Governments (COAG). (n.d.). *The performance reporting system.* Retrieved from http://www.coag.gov.au/performance_reporting_system

Cross, M. A. K. D. (2013). Rethinking epistemic communities twenty years later. *Review of International Studies, 39*(1), 137-160. doi: http://dx.doi.org/10.1017/S0260210512000034

Dandenau, S. (2008). Background paper on indicator frameworks: Their different types, levels, and applicability. In M. Stankovitch (Ed.), *Indicators relevant for Indigenous peoples: A resource book* (pp. 219-230). Bagiou City, Philippines: Tebtebba Foundation.

Deacon, R., Osman, R., & Buchler, M. (2009). *Audit and interpretative analysis of education research in South Africa: What have we learnt?* Johannesburg, South Africa: Centre for Education Policy Development.

DeMaria, A. N. (2008). Lies, damned lies, and statistics. *Journal of the American College of Cardiology*, *52*(17), 1430-1431. doi:http://dx.doi.org/10.1016/j.jacc.2008.09.013

Department of Education. (2013). *Government response to the review of reporting requirements for universities.* Retrieved from https://www.education.gov.au/government-response-review-reporting-requirements-universities

Department of Education. (2014a). *2013 Indigenous students.* Retrieved from http://education.gov.au/selected-higher-education-statistics-2013-student-data

Department of Education. (2104b). *2013 Award completions.* Retrieved from http://education.gov.au/selected-higher-education-statistics-2013-student-data

Department of Education Employment and Workplace Relations (DEEWR), & Bradley, D. (2008). *Review of Australian higher education report*. Retrieved from http://www.innovation.gov.au/HigherEducation/ResourcesAndPublications/ReviewOfAustralianHigherEducation/Pages/ReviewOfAustralianHigherEducationReport.aspx

Department of Education, Employment and Workplace Relations. (2011a). *The national report to Parliament on indigenous education and training, 2008.* Canberra, ACT: Department of Education, Employment and Workplace Relations. Retrieved from http://www.deewr.gov.au/Indigenous/Resources/Pages/ReportStatistics.aspx

Department of Education, Employment and Workplace Relations. (2011b). *Undergraduate applications offers and acceptances 2011*. Canberra, ACT: Commonwealth of Australia. Retrieved from http://www.deewr.gov.au/HigherEducation/Publications/HEReports/Documents/UndergraduateApplications2011.pdf

Department of Education and Training. (2014). *HEIMSHELP: Data elements dictionary.* Retrieved from http://heimshelp.education.gov.au/sites/heimshelp/2015_data_requirements/2015dataelements/pages/316

Devlin, M. (2009). Indigenous higher education student equity: focusing on what works. *Australian Journal of Indigenous Education, 38*, 1-8.

DeWalt D, Callahan L, Hawk V, Broucksou K, Hink A, Rudd R, Brach C. (2010). Health Literacy Universal Precautions Toolkit. Agency for Healthcare Research and Quality. Retrieved from: http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/.

Doyle, T., & Prout, S. (2012). Indigenous student mobility, performance and achievement: Issues of positioning and traceability. *International Journal of Educational Research, 54*, 41-49. doi: http://dx.doi.org/10.1016/j.ijer.2011.12.002

Drew, N., Adams, Y., & Walker, R. (2010). Issues in mental health assessment with Indigenous Australians. In N. Purdie, P. Dudgeon, & R. Walker (Eds.), *Working together: Aboriginal and Torres Strait Islander mental health and wellbeing principles and practice*. Canberra, ACT: Department of Health and Ageing.

European Statistical System. (2011). European Statistics code of practice. Retrieved from http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/documents/CoP_October_2011.pdf

Gal, I. (2002). Adults' statistical literacy: Meanings, components, responsibilities. *International Statistical Review, 70*(1), 1-25. doi: 10.1111/j.1751-5823.2002.tb00336.x

Gilbert, N. (2010). *ABS Data Quality Framework: Linking quality assessment to development of performance indicators*. Paper presented at the European Conference of Quality in Official Statistics.

Hamblin, D. J., & Phoenix, D. A. (2012). A model for managing data assurance in higher education. *Journal Of Higher Education Policy & Management. 34*(4), 421-435. doi:10.1080/1360080X.2012.689195

International Standards Organization. (2004). *Information technology-metadata registries (MDR) - Part 4: Formulations of data definitions.* Retrieved from https://www.iso.org/obp/ui/#iso:std:iso-iec:11179:-4:ed-2:v1:en

Jordan, K., Bulloch, H., & Buchanan, G. (2010). Statistical equality and cultural difference in Indigenous wellbeing frameworks: A new expression of an enduring debate. *Australian Journal of Social Issues, 45*(3), 333-362.

Jordan, K. (2012). Indigenous job training: Questioning the numbers. Canberra, ACT: Centre for Aboriginal Economic Policy Research, Australian National University. Retrieved from http://caepr.anu.edu.au/Publications/topical/2012TI2.php

Kinnane, S., Wilks, J., Wilson, K., Hughes, T., & Thomas, S. (2014). *'Can't be what you can't see': The transition of Aboriginal and Torres Strait Islander students into higher education*. Sydney, NSW: Office for Learning and Teaching, Department of Education.

Kippen, S., Ward, B., & Warren, L. (2006). Enhancing Indigenous participation in higher education health courses in rural Victoria. *Australian Journal of Indigenous Education, 35*, 1-10.c

Laux, R., & Barham, C. (2012). *Can't see the wood for the trees? Using statistical frameworks to draw the bigger picture*. Paper presented at the International Association of Official Statistics conference, Kiev.

Leiserowtiz, A. (2007). Communicating the risks of global warming: American risk perceptions, affective images, and interpretive communities. In S. C. Moser & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 44-63). New York, NY: Cambridge University Press.

Martin, D., Morphy, F., Sanders, W., & Taylor, J. (2004). *Making sense of the census: Observations of the 2001 enumeration in remote Aboriginal Australia*. Canberra, ACT.

Miller, C. (2007). Education and training for Indigenous people in prisons. In S. Dawe (Ed.), *Vocational education and training for adult prisoners and offenders in Australia: Research readings* (pp. 204-234). Adelaide, SA: NCVER. Retrieved from http://www.ncver.edu.au/publications/1789.html.

Moreton-Robinson, A., & Walter, M. (2009). Indigenous methodologies in social research. In M. Walter (Ed.), *Social research methods: An Australian perspective* (2nd ed., pp. 1-18). Melbourne, Vic: Oxford University Press.

Moreton-Robinson, A., Walter, M., Singh, D., & Kimber, M. (2011). *On stony ground: Governance and Aboriginal and Torres Strait Islander participation in Australian universities. Report to the Review of Higher Education Access and Outcomes for Aboriginal and Torres Strait Islander People*. Canberra, ACT: Department of Education, Employment and Workplace Relations.

Morphy, F. (2006). Lost in translation?: Remote Indigenous households and definitions of the family. *Family Matters* (73), 23-31.

Nakata, M. (2007). *Disciplining the savages: Savaging the disciplines*. Canberra, ACT: Aboriginal Studies Press.

Nakata, M. (2013). The rights and blights of the politics in Indigenous higher education. *Anthropological Forum: A Journal of Social Anthropology and Comparative Sociology*, 1-15. doi:10.1080/00664677.2013.803457

National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data (NAGATSIHID). (2006). *National Aboriginal and Torres Strait Islander health data principles.* Retrieved from http://www.aihw.gov.au/nagatsihid/

National Forum on Education Statistics. (2009). *Forum guide to metadata: The meaning behind education data.* Retrieved from http://nces.ed.gov/pubs2009/2009805.pdf

National Health and Medical Research Council (NHMRC). (2007). *National statement on ethical conduct in human research*. Retrieved from http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/e72-jul09.pdf

Northwest Environmental Data-Network (2006). *Best practices for data dictionary definitions and usage.* Retrieved from http://www.pnamp.org/sites/default/files/best_practices_for_data_dictionary_definitions_and_usage_version_1.1_2006-11-14.pdf

O'Neill, M., Kirov, E., & Thomson, N. (2004). A review of literature on disability services for Aboriginal and Torres Strait Islander peoples. *Australian Indigneous Health Bulletin, 4*(4). http://www.healthinfonet.ecu.edu.au/html/html_bulletin//bull_44/reviews/oneill/reviews_oneill.pdf

Oxenham, D. (2000). Aboriginal terms of reference. In P. Dudgeon, D. Garvey, & H. Pickett (Eds.), Working with Indigenous Australians: A handbook for psychologists (pp. 109–125). Perth, WA: Gunada Press.

Pakeha, E. (2011). Submission from Eike Pakeha to the Review of Higher Education Access and Outcomes for Aboriginal and Torres Strait Islander People context paper. Retrieved from http://www.innovation.gov.au/HigherEducation/IndigenousHigherEducation/ReviewOfIndigenousHigherEducation/Documents/Submissions/SubmissionfromEikePakeha.PDF

Panel for the Review of Higher Education Access and Outcomes for Aboriginal and Torres Strait Islander people. (2011). *Review of higher education access and outcomes for Aboriginal and Torres Strait Islander people: Context paper and call for submissions*. Canberra, ACT: Commonwealth of Australia. Retrieved from http://www.deewr.gov.au/Indigenous/HigherEducation/ReviewofIndigenousHigherEducation/Submissions/Documents/IndigenousHigherEducationReview-ContextPaper.pdf.

Pechenkina, E., & Anderson, I. (2011). *Background paper on Indigenous Australian higher education: Trends, initiatives and policy implications*. Canberra, ACT: Commonwealth of Australia. Retrieved from http://www.innovation.gov.au/HigherEducation/IndigenousHigherEducation/ReviewOfIndigenousHigherEducation/Documents/CommissionedResearch/PechenkinaAnderson.pdf

Phillips KPA Pty Ltd. (2012). *Review of reporting requirements for universities: Final report*. Retrieved from http://www.lhmartininstitute.edu.au/news-updates/latest-news-updates/248-review-of-universities-reporting-requirements-recommends-move-to-a-national-higher-education-inform

Polkinghorne, D. (1983). *Methodology for the human sciences: Systems of inquiry*. Albany, NY: State University of New York Press.

PREMIS Working Group. (2005). *Data dictionary for preservation metadata.* Retrieved from http://www.loc.gov/standards/premis/v1/premis-dd_1.0_2005_May.pdf

Productivity Commission. (2011). *Disability care and support: Productivity Commission Inquiry report*. Canberra, ACT: Commonwealth of Australia. Retrieved from http://www.pc.gov.au/projects/inquiry/disability-support/report.

Prout, S. (2010). Developing measures of population mobility amongst Indigenous primary school students, *CAEPR Working Paper No. 73/2010*. Canberra, ACT: CAEPR, Australian National University.

Rigby, W., Duffy, E., Manners, J., Latham, H., Lyons, L., Crawford, L., & Eldridge, R. (2011). Closing the Gap: Cultural safety in Indigenous health education. *Contemporary Nurse*, 37(1), 21-30. doi:10.5172/conu.2011.37.1.02

Rowse, T. (2009). Official statistics and the contemporary politics of Indigeneity. *Australian Journal of Political Science, 44*(2), 193-211.

Rowse, T., & Smith, L. (2010). The limits of 'elimination' in the politics of population. *Australian Historical Studies, 41*(1), 90-106. doi: 10.1080/10314610903317598

Schield, M. (2004). Information literacy, statistical literacy, data literacy. *IASSIST Quarterly, Summer/Fall*, 6-11. http://www.iassistdata.org/content/information-literacy-statistical-literacy-data-literacy

Shotton, H., Lowe, S. C., & Waterman, S., J. (Eds.). (2012). *Beyond the asterisk: Understanding native students in higher education*. Herndon, VA: Stylus Publishing.

Smith, L. T. (2012). *Decolonizing methodologies: Research and Indigenous peoples* (2nd ed.). London, UK: Zed Books.

Stankovitch, M. (Ed.). (2008). *Indicators relevant for Indigenous peoples: A resource book*. Baguio City, Philippines: Tebtebba Foundation: Indigenous Peoples' International Centre for Policy Research and Education.

Statistics Canada. (2009). Federal data scan: Aboriginal data in Statistics Canada's education data sources. Retrieved from http://www.cmec.ca/Publications/Lists/Publications/Attachments/229/federal-aboriginal-data-scan-march2009.pdf

Statistics New Zealand. (2002). *Towards a Māori Statistical Framework: A discussion document*. Wellington, NZ: Statstics New Zealand. Retrieved from http://www.stats.govt.nz/reports/developments/towards-a-maori-stats-framework.aspx.

Steering Committee for the Review of Government Service Provision. (2011). *Overcoming Indigenous Disadvantage: Key Indicators 2011, Chapter 6: Education and training*. Canberra, ACT: Productivity Commission. Retrieved from http://www.pc.gov.au/gsp/indigenous/key-indicators-2011.

Taylor, A., & Dunn, B. (2010). Conceptualising and measuring the mobility of Indigenous students in the Northern Territory. *Australian Journal of Indigenous Education, 39*, 88-97.

Taylor, J. (2011). Postcolonial transformation of the Australian Indigenous population. *Geographical Research, 49*(3), 286-300. doi: 10.1111/j.1745-5871.2011.00698.x

Taylor, J., Doran, B., Parriman, M., & Yu, E. (2012). *Statistics for community governance: The Yawuru Indigenous population survey of Broome.* Canberra, ACT: Centre for Aboriginal Economic Policy Research, Australian NAational University.

Throgmorton, J. A. (1991). The rhetorics of policy analysis. *Policy Sciences, 24*, 153-179.

Throgmorton, J. A. (2000). On the virtues of skilful meandering. *Journal of the American Planning Association*, 66(4), 367-383. doi:10.1080/01944360008976121

Tiplady, T., & Barclay, M. A. (2007). *Indigenous employment in Australian minerals*. Brisbane, Qld: Centre for Social Responsibility in Mining, University of Queensland and Rio Tinto.

Trewin, D. (2002). The importance of a quality culture. *Survey Methodology, 28*(2), 125-133.

Trewin, D. (2003). *Measuring learning in Australia: A framework for education and training Statistics: ABS Catalogue no. 4213.0*. Canberra, ACT: Australian Bureau of Statistics.

Vass, A., Mitchell, A., & Dhurrkay, Y. (2011). Health literacy and Australian Indigenous peoples: an analysis of the role of language and worldview. *Health Promotion Journal of Australia, 22*(1), 33-37. doi:http://dx.doi.org/10.1071/HE11033

Walter, M. (2010). The politics of the data: How the Australian statistical Indigene is constructed. *International Journal of Critical Indigenous Studies, 3*(2), 45-56.

Walter, M., & Andersen, C. (2013). *Indigenous statistics: A quantitative research methodology*. Walnut Creek, CA: Left Coast Press.

Wereta, W., & Bishop, D. (2004). *Towards a Māori Statistics Framework*. Paper presented at the Aboriginal Policy Research Conference, meeting on indigenous peoples and indicators of well-being, March 2006, Ottawa, Canada.

Wijesekere, G. (2008). Indigenous population data for evaluation and performance measurement: A cautionary note. *Australian Aboriginal Studies*(2), 32-42.

Wilks, J., & Wilson, K. (2014). *'Can't be what you can't see': The Transition of Aboriginal and Torres Strait Islander students into higher education: Literature Review*. Sydney, NSW: Office for Learning and Teaching, Department of Education.

Wilks, J. & Wilson, K. (2015). A profile of the Aboriginal and Torres Strait Islander higher education student population. . Article in press.

Willems, J. (2012). Educational resilience as a quadripartite responsibility: Indigenous peoples participating in higher education via distance education. *Journal of Open, Flexible and Distance Learning,* 16(1), 14-27.

Wilson, T., & Barnes, T. (2007). Continuing challenges in attempting to measure the size, and changing size, of Australia's Indigenous population. *People and Place, 15*(3), 12-21.

Yu, P. (2011). *The power of data in Aboriginal hands.* Retrieved from http://caepr.anu.edu.au/sites/default/files/Seminars/presentations/Peter%20Yu%20-%20The%20Power%20of%20Data%20in%20Aboriginal%20Hands2.pdf

Zarcadoolas, C., Pleasant, A., & Greer, D. S. (2003). Elaborating a definition of health literacy: A commentary. *Journal of Health Communication*, 8, 119-120.

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