

Disability disaggregation of Education Management Information Systems (EMISs) in the Pacific: a review of system capacity

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Pacific Island governments have to report against an increasing number and range of global and regional education indicators that require disability-disaggregated data for monitoring disability-inclusive education. Given the effort required to adapt data systems and build capacity for disability disaggregation, it is imperative that indicators provide optimal information to inform policy and planning. This paper reviews current approaches to disability data collection and disaggregation within Education Management Information Systems (EMISs) across 14 Pacific Island countries. It compares disability-related education indicators from the Sustainable Development Goals, the Convention on the Rights of Persons with Disabilities, the Incheon Strategy, and the Pacific Education Development Framework in relation to current capacity of Pacific EMISs to report against these. Amongst the countries studied, the most common approach to EMIS disability disaggregation is to categorise children based on impairments, which is less reliable and comparable as a measure than categories based on difficulties in functioning. Data on school accessibility, human resources related to inclusion and learning support needs is rarely included in EMISs and then only sparsely. Measurement of regional and global disability indicators requires minor to substantial adaptations to the EMISs, outlined in the paper at a country-specific level. 'Granular' EMISs, which are based on individual student electronic files, are increasingly common in the Pacific and offer greater capacity for disability disaggregation and analysis of data. A range of recommendations are discussed for enhancing the data systems to enable reporting against the indicators and a more useful evidence base for disability-inclusive education.

Keywords: disability disaggregation; education management information system (EMIS); disability-inclusive education; indicators; Pacific islands

In line with global efforts to scale-up access to quality education for children with disabilities, better data is required for planning, resourcing and measuring processes and outcomes. This requires governments to have valid and reliable data within Education Management Information Systems (EMISs) to enable disaggregation by disability. The main

purpose of an EMIS is to collect and integrate information about educational activities, and to make it available in comprehensive yet succinct ways to a variety of users (Villanueva et al. 2003). Governments use EMISs to manage education systems in a number of ways, for example, to record and monitor school staffing, infrastructure and school grants, or to calculate enrolment rates, student teacher ratios, and completion rates (Abdul-Hamid 2014). EMISs enable learning outcomes to be compared between sub-populations to assess, for example, effects of policies or capacity development approaches, or to identify students at risk of dropping out.

Disability-disaggregation of EMISs – which is contingent on being able to determine disability in students - enables governments to undertake activities such as: calculating disability loading for school grants; determining staffing needs; planning for provision of student learning supports and staff capacity development; budgeting for implementation of disability-inclusive education policies; measuring outcomes of those policies; and determining whether there are differential outcomes for students with different types or degrees of disability (Sprunt 2014). Disability disaggregation can simply involve processes to distinguish people with disabilities from those without disabilities, using disability as a single variable. Alternatively, it can provide more specific disaggregation, enabling detailed analysis based on categories of disability.

The call for disability-disaggregation of EMISs has grown over many years (PIFS 2012, Robson 2005, GPE 2013, UNDESA 2014, Savolainen et al. 2000, Mitra 2013). Disability disaggregation of datasets is acknowledged as central to the process of establishing baselines and measuring progress against the Sustainable Development Goals (SDGs) (CRPD Secretariat 2015). Furthermore, Article 31 of the UN Convention on the Rights of Persons with Disabilities (CRPD) outlines the obligations of States Parties to collect appropriate disaggregated data to enable them to formulate and implement policies and to help assess the implementation of obligations under the CRPD (UN 2006). *Education 2030 Incheon Declaration Framework for Action*, the new global education agenda which addresses Goal 4 of the SDGs (UNESCO & WEF 2015), includes the requirement for unequivocal and targeted support to Member States to enable reporting of disaggregated EMIS data by a range of characteristics, including disability. Indeed SDG target 17.18 is to, by 2020, support States to significantly increase the availability of ‘high-quality, timely and reliable data disaggregated by gender, age, ethnicity, disability (and) geographic location’ (UNESC 2015):46.

Like other large data collection efforts, the human resource cost of regularly collecting and entering data in every school is substantial. Data requirements must be carefully selected to maximise usefulness whilst minimising time required. Disaggregation using a simple ‘Yes/No’ classification for disability would take the least amount of time however this is inadequate for meaningful disability measurement (Mont 2007, Loeb et al. 2008). The International Classification of Functioning, Disability and Health (ICF) conceptualises

disability as difficulties in human functioning in the areas of impairment, activity limitation and participation restriction; these difficulties result from interactions between a person (with a health condition) and contextual (personal and environmental) factors (WHO 2001, Leonardi et al. 2006). The universal applicability of the ICF enables activity limitations and participation restrictions experienced in an education context to be located within the schema used to classify disability. To understand factors related to access to education for children with disabilities, it is inadequate to simply measure the number of children with functional limitations that are in or out of a school system. It is vital to measure variables that relate to the environment and which act as barriers or facilitators, such as accessibility of the physical school environment and transport, inclusive teaching practices, access to assistive technology and accessible learning materials. Inclusion of this broader set of information in EMISs is important to build government knowledge systems that can inform disability-inclusive education policies and their implementation. One of the aims of this study is to explore the extent to which these environmental factors are included in EMISs in the region.

Disability-inclusive education in the Pacific

The Pacific region is vast and complex with diverse peoples spread across many thousands of islands spanning millions of square kilometres of ocean (Vince 2015). The countries in this study are from the three ethnogeographic groupings: Melanesia (Fiji, Papua New Guinea, Solomon Islands and Vanuatu), Polynesia (Niue, the Cook Islands, Samoa, Tonga, Tuvalu), and Micronesia (Federated States of Micronesia, Kiribati, Nauru, Palau, and Republic of the Marshall Islands).

Since 2009, the Pacific Education Development Framework (PEDF) has had an explicit cross-cutting theme: ‘Students with special educational needs and inclusive education’ (PIFS 2009b). The vast majority of Pacific Island countries have either distinct special or inclusive education policies or reference to the inclusion of all students within general education policies (Forlin et al. 2015). Pacific Island governments, through ratifying or signing the CRPD and/or the Incheon Strategy (UNESCAP 2012), have committed to disability-inclusive education, which is also reflected in the 2015 Pacific Regional Conference on Disability Outcomes Statement (PDF 2015). The Incheon Strategy, adopted in Incheon, Korea in November 2012 at a high-level intergovernmental meeting of 60 countries from the Asia and the Pacific regions, contains a set of cross-sectoral disability-inclusive development goals for the decade 2013-2022, focused on improving the quality of life and fulfilment of the rights of people with disabilities in the region. However, despite the range of political commitments and existence of legislation and policies, widespread implementation of disability-inclusive education in the Pacific has been slow (Miles et al. 2014) and there is ambiguity about how to successfully implement and measure its effectiveness (PIFS 2009a, Forlin et al. 2015).

Disability-disaggregated EMISs have the potential to play a principal role in Pacific Island governmental knowledge systems for disability-inclusive education, enabling national level planning and measurement. They could also provide the data to measure and report against regional frameworks such as the PEDF (PIFS 2009b) and the Incheon Strategy (UNESCAP 2012), and the global frameworks – the SDGs and the CRPD. Three initiatives underway in the Pacific contribute to progressing education statistics in the region: UNESCO’s Institute of Statistics, the Secretariat of the Pacific Community’s (SPC) program ‘Strengthening Education Management Information Systems in the Pacific’, and the Ten-Year Pacific Statistics Strategy (Kelly et al. 2014). However, alongside these broader approaches to strengthen EMISs and other statistical systems, knowledge and capacity is required to ensure appropriate and valid methods for disability disaggregation to fulfil the potential role of EMISs.

Given these regional efforts to improve Pacific EMISs and statistics, the increasing number and range of indicators that Pacific Island governments have to report against, and the global urgency for and momentum around disability-disaggregated data, it is timely to review and critique current approaches to disability data collection within Pacific EMISs. This paper aims to: (i) compare the types of disability data collected in Pacific Island EMISs at the primary and secondary school levels, including data on environmental factors; and (ii) review the status of and system capacity for disability-disaggregation within Pacific Island EMISs in relation to global and regional reporting requirements for indicators of education of children with disability. The paper will provide Pacific Island governments with information that supports effective decisions to improve methods for disability disaggregation in EMISs, to inform planning and resourcing of education for children with disabilities and better enable reporting against relevant indicators.

Methodology

EMIS documents including electronic versions of EMIS formats, policies, reports and statistical digests from 14 Pacific Island Ministries of Education listed in Table 1 were collected in September 2015 from EMIS officers of Ministries of Education and from the SPC. Some of these documents that were open access were also collected from government websites. Any clarification or further information required was achieved via follow up email correspondence with EMIS officers. The analysis and results were sent to all countries as well as the three most relevant regional agencies working on disability, education and data: SPC, Pacific Islands Forum Secretariat (PIFS) and the Pacific Disability Forum (PDF), to receive feedback and ensure appropriate representation of data.

The framework for analysing the documents was informed by a range of international and Pacific literature (UNICEF 2015a, UNESCO 2011, Sprunt 2014, DoE 2008a, Forlin et al.

2015, Sharma et al. 2016). Firstly, EMISs were categorised into overall data system types. Secondly, all data fields in the systems were reviewed to identify those that related to education of children with disabilities. This included the following fields: disability categories (e.g. vision, hearing, physical, etc); staff qualifications or training related to special and/or inclusive education; accessibility/infrastructure; and access to specialist services or reasonable accommodation, including teacher aides (Table 1). Thirdly, global and regional frameworks that require disability-disaggregated data were used to consider the countries' current EMIS capacity for reporting disability data (Table 2). The two **global** frameworks included in the analysis were the CRPD (CRPD 2009) and the SDGs, including core indicators as well as additional thematic indicators from *Education 2030*. These thematic indicators were developed to enable monitoring education targets more comprehensively than what would be possible with the limited number of core SDG indicators. Indicators from **regional** frameworks included in this analysis were from the Incheon Strategy (UNESCAP 2014) and the PEDF (PIFS 2015).

Only indicators related to primary and secondary education from the named frameworks are included. Countries were coded against each indicator (see Table 2) based on whether the EMISs are capable of reporting against the indicator using the current system, whether they need minor modifications to enable reporting against the indicator, or whether substantial modification was required. In addition, coding indicated whether household surveys or population census data are needed to measure the indicator. An example of a minor modification is the relatively simple inclusion of a new question in the EMIS such as whether schools have adapted infrastructure, or a new analysis of existing data that could be automated within existing computerised systems. An example of a substantial modification is the inclusion of a new matrix in an EMIS census form which requires additional relatively complex collection and manual disaggregation of new data at the school level or the development of new data systems or linkages.

Results

Types of data collection systems

Most countries in the Pacific disaggregate their EMIS by disability to some extent, using one or more of three main approaches.

1) Granular systems: Recording disability data on individual children's electronic files in EMISs, where each student file has a unique student identification (ID) number. Within granular EMISs, each child's record includes 'granules' of data, covering a large variety of variables, such as registered birth number, parent details, gender, ethnicity, date of birth, household income, school attendance, or financial assistance. The greater the extent of data sub-division into data fields, the more granular the system is. Compared to EMISs in which data is aggregated at the school level and individual data cannot be distinguished in the total

figures, EMISs that have *any* degree of individual data recorded electronically are considered ‘granular’ for the purpose of this paper.

2) Census-based systems: Annual school censuses are generally conducted within two months of the school year commencing. Census data collection comprises a frequently lengthy form for schools to complete with a variety of matrices that aggregate data such as total number of boys and girls with disabilities in each class. Within a census-based system, information such as enrolments by age, class and gender, or student transfers in or out of the school is collected.

3) Systems with separate disability databases: Data on children with disabilities are collected in a separate database, which are either integrated into the EMIS or used separately to report on indicators.

These systems are not mutually exclusive and several countries combine elements of the three approaches described above. For example, Vanuatu is transitioning from a census-based system to a granular system and collects information using both approaches currently. Table 1 is coded to identify which type of system is used in each country. Countries with granular systems include: Fiji, Federated States of Micronesia (FSM), Nauru, The Republic of the Marshall Islands (RMI), Palau, Tuvalu and Vanuatu. Countries with an annual school census-based EMIS include: Cook Islands, Kiribati, Nauru, Niue, Papua New Guinea (PNG), Samoa, the Solomon Islands, Tonga, Tuvalu and Vanuatu. Countries with a separate, detailed database of children with disabilities include: Cook Islands, FSM, Niue, Palau, PNG, RMI and Samoa. Samoa introduced a system of unique student numbers which are currently linked to assessment and will link to the census data soon; it also has a separate database of children with disabilities, which is currently the information source for reporting disability indicators.

Comparison of the disability-related information collected in Pacific EMISs

In addition to the overall approach of the EMIS, countries vary in the kind of disability information collected, for example the choice of categories to distinguish between ‘types’ of disability. Table 1 illustrates areas of comparability and variation in the way disability is captured in the EMISs across the 14 Pacific Islands. Thirteen countries include a means of separating data into ‘types of disability’, based on impairments, domains of activity limitation or a combination of both; one country collects overall number of children with disability. Most EMISs collect detailed infrastructure information on schools such as number and condition of classrooms and toilets, however only one EMIS (Vanuatu) includes questions related to accessibility of the built environment. Staffing information forms a large part of many EMISs, however only five countries (Fiji, RMI, Vanuatu, Cook Islands and Niue) collect any information on staffing related to disability inclusion.

Impairment categories of vision, hearing, speech, physical and intellectual (commonly termed ‘mental disability’) are used most commonly (see Table 1). Kiribati and the Solomon Islands

are the only countries that specifically ask about fine motor skills. Tuvalu and Nauru would capture some children with difficulties with fine motor skills through the category ‘difficulty washing themselves or putting on their clothes’, although it would be impossible to know whether that category was picking up children with difficulties related to fine motor skills, cognition, or other factors. Several countries (5/14) attempt to distinguish between intellectual disabilities and learning disabilities, using terms such as ‘reading’ or ‘slow learner’. The category emotional/behavioural is used least frequently (2/14). Several countries (6/14) have options for ‘other’ and ‘multiple disabilities’. These two categories are difficult to interpret unless, as in Samoa, the disability is specified, or in Fiji the calculation of ‘multiple disabilities’ is by ticking multiple discrete categories on the child’s individual electronic record. In addition to types of disability, Cook Islands, Nauru, Niue and Tuvalu also collect information on severity of the functional limitation (either low/moderate/high, or no difficulty/some difficulty/a lot of difficulty/cannot do at all).

Data are also collected on a selection of health conditions or diagnostic categories, such as Down Syndrome, cerebral palsy, autism and albinism. The collection of data on these conditions varies across the region. For example, the northern Pacific countries use a detailed system of forms, including relatively advanced diagnostic categories to comply with the United States Department of Education requirements for funding and technical support. This level of detail is stored in separate disability databases, as outlined in Table 1.

Assessment of children to support disability categorisation in Pacific EMISs

In most countries, the determination of disability category under which the child will be listed is made by the schools, with no definitions or guidance provided by Ministries of Education (MoE) in the EMIS data collection system. In some countries however, categorisation is supported by specialist staff who assess the children. The Cook Islands MoE’s Inclusive Education Officer assesses all children identified by schools to determine or verify functional limitations and learning support needs. Niue does this also, although there is only one student with disability known in this small country of 1,190 people. Palau, FSM and RMI have specialists providing diagnostic services, although this may not be available across all islands within each country.

In PNG, the EMIS simply records whether a child is registered with the Special Education Resource Centre (SERC). Assessment of children on the SERC registers is made by staff. It was unclear based on the information made available to us how the assessment is undertaken and students are categorised. The PNG Department of Education Statistical Bulletin (PNG DoE 2013) does not include figures on children with disability. The PNG government superintendent of inclusive education noted that the Department of Education does not have an accurate record of students with disability in mainstream schools (Tamarua 2012).

Table 1. Disability/impairment categories, type of data collection system and other disability data recorded in the EMISs in Pacific Island Forum Secretariat member countries

	Type of data collection system			Vision / Sight	Hearing	Speech	Physical	Intellectual	Learning	Emotional / behavioural	‘Other’	Multiple	Additional categories	Additional information recorded
	1	2	3											
Fiji [%]	✓			✓	✓	✓	✓	✓	Reading		✓	%		Links to teacher qualifications & professional development database
Kiribati ^{##}		✓		✓	✓	✓	✓ - moving	Mental disability	✓		✓	✓	Physical disability – holding and gripping	Number of children in the community not attending school due to disability
Nauru ^{^ @}	✓	✓		Difficulty seeing	Difficulty hearing	Difficulty with the language (understanding what you say)	Difficulty walking or climbing steps	Difficulty remembering or concentrating					Difficulty washing themselves or putting on their clothes	
Republic of Marshall Islands ^{!†}	✓		✓	✓	✓	✓	Orthopaedic	Mental	Specific Learning Disability	✓		✓	Developmental delay, Deaf, Blind, Autism, Traumatic Brain, Other health problems	Special education recorded on staff form

Samoa^{!!}		✓	✓	✓	✓	✓	✓	✓			✓ (specify)		Down Syndrome, Epilepsy, Cerebral Palsy, Autistic	
Solomon Islands^{##}		✓		✓	✓	✓	✓ - moving	Mental disability	✓		✓	✓	Physical disability – holding and gripping	Same as Kiribati
Vanuatu	✓	✓		✓	✓	✓	✓	Mental disability	✓ (slow learner)	✓	✓ (albino, epilepsy)	✓	Down Syndrome	Same as Kiribati; presence of specialised disability teacher at the school.
Tuvalu[^] @	✓	✓		Difficulty seeing	Difficulty hearing	Difficulty with the language (understanding what you say)	Difficulty walking or climbing steps	Difficulty remembering or concentrating					Difficulty washing themselves or putting on their clothes	
Tonga		✓		Students are recorded as having a disability, not using impairment categories										Severity of effect of disability or ill-health on attendance
Papua New Guinea		✓	✓	Registered or not registered with the Special Education Resource Centre (SERC); method for categorisation by the SERC unavailable for this review										
Cook Islands[@] & Niue[@]		✓	✓	Impairments are recorded in a separate, detailed database with diagnostic categories unavailable for this review										Number of teacher aides and number of students receiving

					teacher aide support
Federated States of Micronesia, Palau	✓		✓		
Key	% Multiple categories can be ticked; ## A student with multiple disabilities can only be recorded under 'Multiple disability', not recorded under each individual impairment category; ^ Uses the adult set of Washington Group questions (for children from ECCE, primary and secondary); @ Severity of impairment is recorded; !! Children with impairments are recorded in a separate, detailed database.				
	Type of data collection system: 1) Granular 2) Census-based 3) Separate disability database				

Current capacity of Pacific EMISs to report on indicators from global and regional frameworks

Table 2 outlines the global and regional indicators that are expected to be disability-disaggregated. The coding illustrates which of these could be reported using current EMIS capacity within the 14 Pacific EMISs, or the degree of modification required to do so.

Global indicators

As illustrated in Table 2, two of the CRPD indicators (every child with disabilities has access to mandatory primary and secondary education) and one of the SDG indicators (gross intake ratio to the last grade - primary, lower secondary) require all countries to have disability data in household surveys or population censuses against which to compare the EMIS data.

Collection of data on one of the two core SDG indicators (percentage of children achieving at least a minimum proficiency level in reading/mathematics at the end of primary and lower secondary school) would be possible by implementing minor modifications to the current systems in Fiji, FSM, Nauru, Niue, Palau, RMI, Tuvalu, and Vanuatu. Substantial modifications to the systems are necessary in Cook Islands, Kiribati, PNG, Samoa, Solomon Islands and Tonga to collect data on this indicator. It should be noted that this paper focuses on the system capacity for disability-disaggregation of these indicators. Reviewing the accuracy of literacy and numeracy measurements in Pacific Islands is outside the scope of this paper.

The second core SDG indicator (percentage of schools with access to adapted infrastructure and materials for students with disabilities) is similar to the CRPD indicator 'schools are accessible'. To collect data on these indicators, minor modifications to the current systems in all countries are required, except Vanuatu which already collects relevant information. To report against the indicator 'completion rate - primary, lower secondary and upper secondary', the current system is adequate in 4 of the 14 countries (FSM, Niue, Palau, and RMI), while minor modifications are required in the remaining ten countries. Data collection on the indicator 'percentage of children over-age for grade - primary, lower secondary', also requires minor modifications to the current systems in eight countries (Fiji, FSM, Nauru, Niue, Palau, RMI, Tuvalu, and Vanuatu) and substantial modifications in the remaining six countries.

Table 2. Pacific Island countries' capacity for disability-disaggregated reporting against global and regional education indicators (primary/secondary)

Framework and Indicators	Code: ✓ = can report using current system M = minor modifications to current system required to report on indicator S = substantial additions to current system required to report on indicator H = household survey/population census data required	Cook Islands	Fiji	FSM	Kiribati	Nauru	Niue	Palau	PNG	RMI	Samoa	Sol. Islands	Tonga	Tuvalu	Vanuatu
GLOBAL INDICATORS															
UN CRPD¹															
Every child with disabilities has access to mandatory primary education		H	H	H	H	H	H	H	H	H	H	H	H	H	H
Every child with disabilities has access to mandatory secondary education		H	H	H	H	H	H	H	H	H	H	H	H	H	H
Schools are accessible		M	M	M	M	M	M	M	M	M	M	M	M	M	✓
Sustainable Development Goal 4 – including <i>Education 2030</i> indicators															
Core indicator: % of children/young people (i) in Grade 2/3, (ii) at the end of primary and (iii) at the end of lower secondary achieving at least a minimum proficiency level in (a) reading and (b) mathematics ^{2,3}		S	M	M	S	M	M	M	S	M	S	S	S	M	M
Core indicator: % of schools with access to adapted infrastructure and materials for students with disabilities ^{2,4}		M	M	M	M	M	M	M	M	M	M	M	M	M	✓
Gross intake ratio to the last grade (primary, lower secondary) ⁵		H	H	H	H	H	H	H	H	H	H	H	H	H	H

Completion rate (primary, lower secondary, upper secondary) ^{5,6}	M	M	✓	M	M	✓	✓	M	✓	M	M	M	M	M
% of children over-age for grade (primary, lower secondary) ⁵	S	M	M	S	M	M	M	S	M	S	S	S	M	M
REGIONAL INDICATORS														
Pacific Education Development Framework (Sept 2015) ⁷														
Formal Education (primary and secondary):														
Net Enrolment Ratio	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Gross Enrolment Ratio	H	H	H	H	H	H	H	H	H	H	H	H	H	H
% new entrants to 1 st year primary with ECCE experience	S	S	S	S	S	✓	S	S	S	S	S	S	S	S
Repetition rate	M	M	M	S	M	✓	M	S	M	S	S	S	M	M
Drop-out rate	M	M	M	S	M	✓	M	S	M	S	S	S	M	M
Promotion rate	M	M	M	S	M	✓	M	S	M	S	S	S	M	M
Transition rate (primary/secondary)	S	S	S	S	S	✓	S	S	S	S	S	S	S	S

¹ United Nations Committee on the Rights of Persons with Disabilities (2009). Guidelines on treaty-specific document to be submitted by states parties under article 35, paragraph 1, of the Convention on the Rights of Persons with Disabilities Geneva, United Nations. CRPD/C/2/3

² United Nations Economic and Social Council (2015). *Report of the Inter-agency and Expert Group on Sustainable Development Goal Indicators E/CN.3/2016/2*.

³ The indicator requires the development of a global metric for each subject as a reference point. (WEF 2015)

⁴ Major preparatory work is required to develop an approach on assessing school conditions for people with disabilities across countries. (WEF 2015)

⁵ World Education Forum (2015). Technical Advisory Group Proposal: Thematic Indicators to Monitor the Post-2015 Education Agenda. ED/WEF2015/REF/10, UNESCO

⁶ This indicator is currently available but work is required to finalise a common methodology and increase the number of surveys available to calculate it. (WEF 2015)

⁷ Pacific Islands Forum Secretariat (2015). List of Pacific Education Development Framework (PEDF) Indicators. Suva, Fiji, Pacific Islands Forum Secretariat.

Percentage out-of-school returning to formal schooling	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Literacy rate	S	M	M	S	M	M	M	S	M	S	S	S	M	M
Numeracy rate	S	M	M	S	M	M	M	S	M	S	S	S	M	M
% school leavers with at least a national or regional qualification	M	M	✓	M	M	✓	✓	M	✓	M	M	M	M	M
Teacher Development:														
Teacher training curriculum includes mandatory course on Disability-Inclusive Education	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Incheon Strategy ⁸														
Primary education enrolment rate of children with disabilities	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Secondary education enrolment rate of children with disabilities	H	H	H	H	H	H	H	H	H	H	H	H	H	H
% of children who are deaf that receive instruction in sign language ⁹	S	S	S	S	S	S	S	S	S	S	S	S	S	S
% of students with visual impairments with educational materials in readily accessible formats ⁹	S	S	S	S	S	S	S	S	S	S	S	S	S	S
% of students with intellectual disabilities, developmental disabilities, deafblindness, autism and other disabilities who have assistive devices, adapted curricula and appropriate learning materials ⁹	S	S	S	S	S	S	S	S	S	S	S	S	S	S

⁸ UNESCO (2014). ESCAP Guide on Disability Indicators for the Incheon Strategy. Bangkok, United Nations Publication. ST/ESCAP/2708

⁹ Non-mandatory indicator

Regional indicators

As seen in Table 2, all countries require household survey or population census data to report on regional (PEDF and Incheon Strategy) indicators including disability-disaggregated primary and secondary net and gross enrolment ratios and percentage of out-of-school children returning to formal schooling. Substantial modifications to current systems are required across all countries to gather information on percentage of children who are Deaf and who receive instruction in sign language; percentage of students with visual impairments with educational materials in readily accessible formats; and percentage of students with intellectual, physical, or any other disabilities who have assistive devices, adapted curricula, and appropriate learning materials.

Collection of data on teacher preparedness for the PEDF indicator ‘Teacher training curriculum includes mandatory course on Disability-Inclusive Education’, requires minor modifications in existing data collection systems in all countries. In countries that do not have teacher training programs, measurement would either have to relate to the teaching institutes in other countries where teacher trainees go for teacher training, or the indicator could be reported as ‘not applicable’.

The existing systems in Niue, FSM, Palau, and RMI can provide data on the regional indicator ‘percentage of school leavers with at least a national or regional qualification’ (similar to the global indicator on completion rate), while the remaining ten countries require minor modifications to their systems. Substantial modifications are required for all countries (except Niue) to report against ‘percentage of new entrants to first year primary with ECCE experience’ and ‘transition rate (primary and secondary)’. Due to the very small number of children identified as having disabilities, i.e. one child, the current system in Niue enables collection of data on repetition rate, drop-out rate, and promotion rate; whereas minor modifications are required to report on these indicators in the Cook Islands, Fiji, FSM, Nauru, Palau, RMI, Tuvalu and Vanuatu, and substantial modifications are required for Kiribati, PNG, Samoa, Solomon Islands and Tonga. To report disaggregated data on literacy and numeracy rates, minor modifications are required to the systems of Fiji, FSM, Nauru, Niue, Palau, RMI, Tuvalu and Vanuatu; and substantial modifications to Cook Islands, Kiribati, PNG, Samoa, Solomon Islands and Tonga.

Discussion

This paper compares the types of disability data collected in Pacific EMISs and reviews the capacity of those EMISs to provide data to enable reporting against a range of indicators of access to quality education by children with disabilities. The results indicate that mechanisms for some level of disability-disaggregation are in place in almost all Pacific Island EMISs included in this review, albeit to a limited extent in most systems. In considering the

usefulness of the data and the strengths and limitations of the EMISs to report on global and regional indicators, there are a number of issues that arise.

Links between disability data from EMISs and population survey or census data

Disability-disaggregation at the simplest level, counting total numbers of children with disabilities per class, by ‘disability type’, and gender, is possible within most existing Pacific EMISs. However, to report on enrolment ratios (number of children with disabilities in school as a proportion of total number of children with disabilities in the population), which SDG, CRPD, PEDF and Incheon Strategy indicators require, the approach to measuring disability in the EMIS needs to be comparable with that used in national population-based data on children with disabilities (WHO & World Bank 2011). This is important as it is likely that many Pacific children with disabilities are out of school (Tavola and Whippy 2010) and outcomes of efforts to reduce this problem need to be measured.

In many Pacific countries, population data on children with disabilities is scant and suffers from variation in definitions, methodologies and measurement tools; a problem identified globally (WHO & World Bank 2011, Maulik and Darmstadt 2007, Cappa et al. 2015). The UN Washington Group on Disability Statistics (WG) in partnership with UNICEF has developed a comparable means of identifying disability amongst children in population censuses and surveys, called the WG/UNICEF Module on Child Functioning and Disability; this uses difficulty functioning (activity limitations, in ICF terms) across 13 domains as the disability indicator (Loeb 2016), with a continuum of difficulty established through the response categories. It would make sense for Pacific MoEs to consider aligning methods of identifying disability within EMISs to enable comparability with this approach being rolled out globally through the UN. In order to do this, MoEs need to work closely with National Statistics Offices (NSO). Samoa tested the WG/UNICEF Module in the recent Demographic Health Survey (DHS) (Government of Samoa 2015) and Fiji has tested the WG/UNICEF Module as a means of disaggregating the EMIS (Sprunt 2014, Sprunt and Marella 2016). Aside from EMISs, there are other means of collecting information to report on some disability-disaggregated indicators, for example population censuses or representative household surveys such as the DHS or the UNICEF Multiple Indicator Cluster Survey. Depending on the modules that NSOs decide to include in those surveys/censuses, a range of data could be calculated on education of children with disabilities, for example enrolment, learning outcomes and participation. The disadvantages of relying on these methods to report on disability indicators are that they are generally only undertaken every five years or more, survey samples can be too small to undertake much impairment-specific analysis, and adding a child disability module to a census is costly. UNESCO recommends the use of multiple sources of data to facilitate monitoring of social inclusion in education (World Education Forum 2015) and cautions about the risk of wrong interpretations and over-generalising the interpretations of household survey data (UNESCO (United Nations Organization for Education Science and Culture) 2011).

National level household surveys may provide estimates for a range of indicators; however, they do not help at the local level with understanding the number of out-of-school children with disabilities in the communities surrounding the school. Vanuatu, Kiribati and the Solomon Islands EMISs require teachers to collect information on out-of-school children with disabilities, which presumably increases the communication with families and others relevant to improving those children's chances of being enrolled. Within the Global Out-of-School Children Initiative, UNICEF highlights the importance of efforts to collect data on children with disabilities (UNICEF 2015b). Save the Children, an international non-government organisation, has done some work on Community EMISs (C-EMIS) (Heijnen 2004) which may offer some utility for Pacific Island governments, if data from the C-EMIS is available for national level reporting. C-EMISs use a community-based survey process which centres around the community identifying out-of-school children, analysing and interpreting the data, and discussing barriers and solutions for improving access to education for excluded children (Kafle and Dahal 2014). Governments would need to pay particular attention to the articulation between a C-EMIS and a national school-based EMIS in order to avoid duplication. Whatever method is used to collect information on out-of-school children with disabilities, it is clearly a very vulnerable sub-population which needs to be counted. Qualitative methods may be a useful means of gathering more in depth data on the barriers preventing inclusion of these children (UNICEF 2015c).

Supporting teachers in selecting categories and severity for disability data in EMISs

A basic problem of impairment-based disability categories in education is variability and inconsistency in use of terminology (Simeonsson et al. 2008). Most of the countries in the study separate data by impairment categories (Table 1), yet do not provide instructions or guidance to support teachers in doing so. Without appropriate guidelines, definitions and training of school personnel, it is difficult to be confident about the validity or reliability of the data. For example, 'mental disability' could be interpreted as related to psychosocial impairments or to intellectual/ cognitive impairments. In particular, the categories of intellectual, learning and emotional/ behavioural are open to variation in interpretation. It is more reliable and easier for teachers to observe functional difficulties and identify learning support needs, and resulting information is more relevant to inclusive education service provision. Using the UNICEF/Washington Group Module as the tool for categorisation of disability would shift the basis of categories from impairments to difficulties with certain activities. Learning support needs would not directly arise from this tool, however identifying areas of difficulty may assist teachers to more systematically consider these needs; this is explored further in a later section.

The lack of capacity within most EMISs to distinguish between severities of disability means that children with mild functioning difficulties are categorised the same as children with substantial ongoing support needs. The level of difficulty experienced by a child, when

matched with learning support needs information, can be useful, for example, in informing human resource planning, estimating teacher aide requirements, or assessing whether only children with mild impairments are benefiting from inclusion policies.

Variation in geography, resources and capacity in education, health and social affairs sectors results in different approaches to determining disability categories for EMISs across the region. For example, the practice in the Cook Islands in which the MoE Inclusive Education officer personally assesses all children identified by schools would not be feasible in larger or more dispersed countries. Similarly, where specialist personnel are available (e.g. the northern Pacific) use of specialist testing may provide useful data to assist in selecting impairment categories on the EMIS. However, in many places, access to these personnel is unattainable and this would be too limiting a factor if EMISs required specialist testing before counting a child. This further adds to the rationale for strengthening the ability of schools to measure functional difficulties, which is consistent with the World Report on Disability recommendations to use a “ ‘difficulties in functioning approach’ instead of an ‘impairment approach’ to determine prevalence of disability and to better capture the extent of disability” (WHO & World Bank 2011):45. Even with this approach however, some difficulties such as hearing can be hard to detect, and relying solely on teachers to detect hearing loss risks missing children who would benefit greatly from services. Each country needs to consider these issues in the context of their own education and health systems’ capacity, and where needed, strengthen linkages between the sectors.

It is important to highlight that, whether categories are based on impairment or difficulty functioning, there are issues that still remain debateable. Identifying children who have difficulty with mobility may be easy, however it can be extremely challenging to accurately identify children with cognitive and learning difficulties. It is possible that teachers may inaccurately assume a child has a cognitive or learning impairment, whereas the student may simply struggle to adapt to the teaching style of the teacher. The labels of disability can be long lasting and can have negative effects on the child’s development. Importantly, teachers, when appropriately trained, may identify children *at risk of* disability; they should not be asked to categorically diagnose disability.

Challenges in the category ‘multiple disabilities’

In some countries, students with more than one impairment are recorded under a column ‘multiple disabilities’, which masks the types of impairment and is very difficult to interpret. A child with mild cognitive and speech difficulties may be categorised as ‘multiple disabilities’, which has very different resource implications from a child with spastic cerebral palsy and profound hearing loss who is a wheelchair user and requires support for eating and toileting. EMISs which allow schools to record children only under one category, the ‘primary disability’, avoid challenges with the category ‘multiple disabilities’ but the reality is that children frequently have difficulties in more than one domain. Systems which enable

each child to be recorded with each of his or her domains of impairment (such as Fiji), and preferably with degree of difficulty, allow much more sophisticated data for planning responses.

The importance of measuring learning support needs, capabilities and access to reasonable accommodation

Many systems focus solely on measuring deficits rather than looking at capabilities and areas which need support to overcome environmental barriers. The significance of these environmental barriers, which co-create the experience of disability, is a central paradigm in the way disability is understood both in the CRPD and in the ICF, as outlined in the introduction. Pacific Disabled Persons Organisations are strongly supportive of this paradigm (PDF 2015). This is a serious consideration for Pacific Island governments in terms of their decisions about how to ‘count’ children with disabilities. As information on learning support needs is arguably the most critical element for planning service provision, and because identification of these needs is a basic skill of teachers, governments should consider ways of incorporating learning support needs into EMISs. However, whilst there are many examples of EMISs which incorporate capabilities, environmental factors and/or learning support needs (Griffin et al. 2010, EADSNE 2011, EADSNE 2012, State of Victoria (Department of Education and Early Childhood Development) 2011) (DET 2015), their implementation is relatively sophisticated and is more common in systems with individual electronic student records, that is, granular EMISs.

Of the global and regional indicators outlined in Table 2, three of the non-core indicators in the Incheon Strategy enable measurement of learning support needs, measured through percentages of children who receive instruction in sign language, materials in accessible formats, assistive devices, adapted curricula and appropriate learning materials. Globally, the SDG indicator that assesses percentage of schools with access to materials for students with disabilities is the indicator which will provide data most relevant to understanding the role of responding to learning support needs. However, the UN acknowledges that this is a difficult indicator, and that ‘major preparatory work will be required to develop an approach on the assessment of school conditions for people with disabilities. This is expected to take 3-5 years (i.e. by 2020).’ (UNSTATS 2016).

A further area for consideration is the inability of many EMISs to distinguish between children with disabilities whose learning support needs have been met and those for whom support is still required, which hampers resource planning or evaluation. The Cook Islands EMIS addresses this in part by recording number of children who have Teacher Aide support; and the special needs databases in FSM, RMI and Palau may include this level of information as they are linked to the children’s Individual Education Programs (IEP). However, the majority of countries need to consider how they interpret data that may indicate, for example, 15 children with hearing impairments and 8 with musculoskeletal impairments. Does that

mean that all 23 children require referrals to services and potentially require hearing aids, mobility devices or other services; or have those services already been provided? Countries with granular EMISs may be able to readily incorporate this type of information as it can be updated on the children's electronic files in real time and used at the MoE level for resource planning. Countries with census-based EMISs could incorporate a new question into the EMIS census form, or may use non-EMIS based mechanisms for gathering this information from schools. Countries with granular systems and IEPs may consider the advantages of using IEP data in the EMIS.

Narrative information may assist interpretation of EMIS data

Interpreting data from evolving systems brings challenges. For example, a report showing higher enrolments of children with disabilities at a school does not provide sufficient information on whether it implies: improvements in access for children with disabilities from the community; an increasing capacity of staff to identify disability amongst existing students; better access to screening services so previously undetected hearing and vision impairments are known; or even a perception by the school that recording more children with disabilities brings more resources to the school. These are challenging areas to provide simple recommendations for. However, it may be useful to include a section in EMISs for schools to provide comments on possible reasons for changes in relation to disability data over time. Reporting on data trends along with narrative explanations from the schools, provides information for government officers to discuss with schools during regular monitoring visits. These monitoring reports could then form sources for periodic evaluation processes to understand the effects of policies and resourcing decisions.

Screening, identification, assessment and support – a model from South Africa

South Africa's Department of Education has a model worth considering, which includes a staged sequence of screening, identification, assessment and support (DoE 2008b). The 'Support Needs Assessment' process assesses children for functional limitations. An 'Extended Learner Profile' includes barriers to: learning and development; communication; behavioural and social competence; health, wellness and personal care; and physical accessibility and transport. Contextual factors assessed include community, family and individual; classroom; and school. An 'Assessment for Support Requirements' form is completed through a combination of a District Based Support Team, the Institution Level Support Team, the educator and parents/caregivers and the student. Eligibility for support is determined based on parents providing reports from medical services, or an assessment by the District Based Support Team.

Interestingly, the South African EMIS does not record information on the severity of disability and only the primary disability is noted. Assessment by the District Support team as an alternative to medical assessment offers a useful flexibility depending on needs and context. This example may offer a solution for simplifying the data required in an EMIS

whilst retaining options for resource planning and evaluation through an alternative database for information on children with disabilities. Several Pacific countries, such as Samoa or the Cook Islands have this capacity. In countries such as Fiji or Vanuatu, the EMIS itself is capable of incorporating learning support needs and data on other environmental factors, such as physical accessibility and a separate database is not needed.

Granular EMISs enable more sophisticated analysis

The shift within some Pacific countries from census-based to granular EMISs bodes well for disability disaggregation. To report on literacy rate by disability type, gender, class, age, ethnicity and location, it is straightforward to compute in a granular system. However in a census-based system, to report against the same indicator with the same variables for disaggregation, it is more difficult and would require complex matrices in the reporting formats.

Granular EMISs that incorporate or are linked to national teacher data systems and student results, e.g. literacy and numeracy assessment outcomes, provide unique opportunities to analyse information in relation to a large variety of relatively complex questions. The types of questions include: which children with which impairments, in which schools, with which learning supports, are achieving what educational outcomes? Are teacher aides with Braille skills located in schools where they are needed? How well do Deaf children with particular learning supports perform on assessments in comparison to Deaf children without those supports? Which teachers with what type of training or qualifications are creating environments that result in good learning outcomes for children with disabilities? There is no doubt that granular EMISs, when based on valid and reliable means of determining disability, provide more and better data for resource planning and policy evaluation.

However, shifting from an annual census-based EMIS to a granular EMIS is not possible for many countries and there is clearly a need to improve the way disability inclusion is understood through the former. UNICEF has published a guide on disability disaggregation of census-based EMISs (UNICEF 2015a), which would be an important tool for several Pacific Island governments to consider. Where available, separate databases with detailed information on children with disabilities, especially when linked to student identification numbers such as in Samoa, offer another alternative for answering some of the more complex questions, while keeping the EMIS itself relatively simple in terms of disability questions.

The challenge of prioritising improvements in complex systems

There are widespread challenges in the Pacific in collecting and using quality data even for fundamental and seemingly basic data such as attendance or literacy and numeracy of the general student population (SPC & SPBEA 2014). Given this, together with the relative infancy of disability-inclusive education policy implementation in the region (PDF and PIFS 2012), and in the context of increasing and competing demands for data within EMISs, it is

understandable that governments have taken a pragmatic approach of collecting minimum data on disability in EMISs, which is impairment based.

Kelly and Cordeiro highlighted the value of administrative data, i.e. EMISs, as part of Pacific national statistics systems, but noted that given the increasing variation, capacity and resourcing in the Pacific Island countries, statistics development strategies need to be differentiated and appropriate to each country (Kelly et al. 2014). Given the variety of types of EMIS in the Pacific – granular, census-based, separate disability database, or commonly a combination of these – the solutions to disability-disaggregated data will be different across the region. An important principle in progressing disability data has to be recognition of countries' starting points. The fact that nearly all countries in this study collect data disaggregated into disability types needs to be acknowledged as a positive foundation. Despite the limitations of impairment-based categorisation discussed in this paper, this approach is widely used in low and middle income country EMISs (UNICEF 2015a) and is likely to be used by some countries globally as a means of disability disaggregation to report against education indicators.

Whilst it is outside the scope of this paper to provide an in depth critique of the indicators of global and regional frameworks, the review highlights the problem of slight variations in indicators seeking to measure very similar concerns and objectives across different frameworks. These variations can lead to substantial additional measurement burden on States parties, entailing financial and opportunity costs. Global collaboration in setting and aligning indicators is critical, with perhaps a degree of compromise required to ensure the 'disability data revolution' helps countries rather than exhausting them and distracting from the task of implementing measures to fulfil the rights of persons with disabilities.

This paper has largely focused on whether and how disability disaggregation of EMISs can be undertaken. However, there are important ethical issues that Pacific Island countries should consider in relation to whether or how data is published in small populations where identification of children may be entirely possible, for example in Niue. Pacific EMISs are in a state of rapid change and the findings of this review should be considered as merely an observation at a point in time. Whilst the issues raised in the paper may remain relevant in the medium to long term, the country-specific results are likely to change over the coming months and years as the EMIS strengthening programs in the Pacific are swiftly achieving improvement in the capacity of the systems. Since the EMISs were compared for this study for example, Fiji has made substantive progress in converting to categorisation based on functioning difficulties, incorporating learning support needs and detailed infrastructure accessibility data (Sprunt 2016).

Conclusion

Eleven years ago, Robson and Evans (Robson 2005) observed that large education data sets in developing countries were ‘fragmentary and inconsistent in their definitions of disability’, providing a poor basis for international comparisons. They also critiqued the reliability and validity of most of the datasets they reviewed. To some extent, this review of disability within Pacific EMISs draws similar conclusions. Many Pacific countries’ disability-related policies align their definitions of disability with the CRPD, providing important regional consistency, however this definition is yet to be translated into valid, reliable and comparable student disability data in Pacific EMISs.

This study has highlighted a number of challenges and provided recommendations throughout the discussion section which may help overcome these. The primary challenge relates to disability definition, particularly the limitations of using ‘impairment’ as the key measure of disability to disaggregate EMISs. Instead, using ‘difficulties in functioning’ as the measure of disability would increase validity and comparability over time and across students, data sources and countries. Importantly, this would enable comparability with population data to answer disability-disaggregated enrolment ratio indicators required for the SDGs, CRPD, Incheon Strategy and the Pacific Education Development Framework.

Other than comparability, there are many other requirements of disability data in EMISs. To enable evidence-based planning, resourcing and evaluation for disability-inclusive education, a number of other recommendations to improve disability disaggregation of EMISs have been discussed in the paper. In summary, these are: including questions on environmental barriers, human resources for inclusion and learning support needs (including a means to differentiate those which have already been, and those yet to be, addressed); collecting information on out-of-school children with disabilities; providing disability disaggregation guidelines, definitions and training to schools; strengthening linkages between education and health sectors, particularly to ensure children identified as having functioning difficulties receive formal assessments and services (eg. vision and hearing services); ensuring families are clear that teachers are not diagnosing disability, rather, identifying children ‘at risk of disability’; ensuring EMISs can capture multiple separate domains of difficulty functioning, or impairment, to avoid the ambiguous category ‘multiple disabilities’; whilst EMISs require ‘deficit’ information on children with disabilities (focusing on difficulties/ impairments/ needs), at the individual assessment and teaching level teachers should ensure children’s capabilities are identified and embraced; where Individual Education Programs (IEP) are in effect, consider including IEP data in the EMIS; collect narrative information in EMISs to support interpretation of quantitative data; and finally, consider the various elements of the screening, identification, assessment and support model used in South Africa, many of which would be applicable in Pacific Island education systems.

Whilst the list of recommendations may appear daunting, there is reason for optimism. The people behind the Pacific EMISs balance the reality of complex and varied geographic, economic and cultural settings, and delicate system change in large government mechanisms, whilst maximising the opportunities of technology and a global appetite for better data to improve education for long-neglected populations. Many Pacific Island countries are in a dynamic period of improving the underlying data systems, allowing opportunities to improve the measurement of disability within their EMIS. Increased availability of technology has enabled many countries to develop granular EMISs, and other countries to move towards doing so. This period of change provides a remarkable window to shape approaches to disability disaggregation so that indicators can provide meaningful information to improve access to quality education for children with disabilities.

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