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LMIP WORKING PAPER 6

Data Considerations for Education and Labour Market Indicators

Fabian Arends and Michael Cosser

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LABOUR MARKET
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Authors: Fabian Arends and Michael Cosser

Institution: Human Sciences Research Council

Email: farends@hsrc.ac.za ; mcosser@hsrc.ac.za

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Preface

One of the gravest economic challenges facing South Africa is high unemployment, but at the same time, a skills mismatch. The market demand for skilled labour is greater than the number of individuals completing post-school education and training. Prospective employers often complain that the education system does not give individuals the necessary skills to be productive in the workplace, or to start their own enterprises.

Government acknowledges that the unemployment crisis is a systematic problem and cannot be addressed by ad hoc interventions scattered across line departments. With this 'big picture' thinking in mind, DHET aims to create broad and equitable access to a full spectrum of post-school opportunities and lifelong learning encompassing adult education and training, workplace training, the FET college system, artisan and technical training, higher education and innovation.

DHET's ability to create these learning opportunities requires a network of partners to gather and maintain a labour market intelligence system. Such a system can provide analytical insights to support policies and intervention programmes.

In February 2012, therefore, DHET commissioned a HSRC led research consortium to support its capacity to create and maintain a labour market information and intelligence system, guided by the national Delivery Agreement 5. The primary focus is the development of a 'strategic intelligence capability' towards the establishment of 'a credible institutional mechanism for skills planning'. The HSRC coordinated research project is organised in terms of six interlocking research themes, two which focus on labour market information and four which focus on labour market intelligence:

- Theme 1. Establishing a foundation for labour market information systems in South Africa
- Theme 2. Skills forecasting: the supply and demand model (*A WITS EPU Project*)
- Theme 3. Studies of selected priority sectors
- Theme 4. Reconfiguring the post-schooling sector
- Theme 5. Pathways through education and training and into the workplace
- Theme 6. Understanding changing artisanal occupational milieus and identities

The consortium made a strategic decision that their research must not duplicate or repeat existing research about the challenges facing South Africa's education and training system and labour markets. Their research must address gaps, promote synergies and explore complementarities.

Hence, as a first step, working papers were commissioned to inform the research agenda for each theme. Although the working papers cover different issues, each has four common dimensions: policy challenges to institutionalise and build a post-school education and training system in South Africa, lessons from seminal national and international research, conceptual frameworks, methodological issues and data challenges raised by this research, and potential research gaps.

One of the HSRC led consortium's goals is to create a living community of practice that researches and debates education, skills and labour market issues. These working papers were presented at a conference in May 2012 to start building such a research network.

The dissemination of these working papers is intended to encourage more individuals to join the research community. We look forward to individuals' comments. They can be emailed to agoldstuck@hsrc.za.za. Welcome to the research community!

Theme 1:	Theme 3:	Theme 4:	Theme 5:	Theme 6:
Establishing a foundation for labour market information system in South Africa	Studies of selected priority sectors	Reconfiguring the post-schooling sector	Pathways through education and training into the workplace	Understanding changing artisanal occupational milieus and identities
Simon McGrath Some international reflections on developing VET indicators	Haroon Bhorat and Morne Oosthuizen Studies of Selected Priority Sectors in the South African Labour Market: A Proposed Research Programme	Andre Kraak Private post-school education in South Africa	Michael Cosser Pathways through education and training and into the labour market	Angelique Wildschut Conceptualising the study of artisans
Phil Toner Establishing a foundation for labour market information systems in South Africa	Peter Jacobs and Tim Hart A critical review of the research on skills development in rural areas	Andre Kraak Differentiation in the post-school sector	Pundy Pillay Pathways through education and training and into the workplace: a concept paper	Jeanne Gamble Models and pathways to institutionalise apprenticeships
Anthony Gewer Developing a framework for institutional planning and monitoring in FET Colleges	Shirin Motala A critical review of research on skills development and labour market demand in the early childhood development sector	Joy Papier et al Contemporary issues in public FET colleges	Sharlene Swartz Navigational capacities for youth employment: A review of research, policies, frameworks and methodologies	
Carmel Marock Developing a framework for understanding SETA performance: Monitoring and evaluating their role in skills planning, steering and enabling a supply within their sector	Thembinkosi Twalo A comparative review of skills development in cooperatives	Veronica McKay A critical review on Adult Basic Education (ABET) in South Africa	Fiona Lewis Traffic jams or trees – how are South African youth progressing through the higher education sector? And what lessons can we learn from current studies?	
Bongiwe Mncwango Towards a demand side firm level survey of labour information in South Africa	Margaret Chitiga and Stewart Development of a national skills forecasting model	Thenjiwe Meyiwa and Nolutho Diko The state of graduate teacher transitions to the labour market	Stephanie Alais Jobs? What jobs? Skills? What skills? An overview of studies examining relationships between education and training and labour markets	

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Michael Cosser and Fabian Arendse Education and labour market indicators	Imraan Valodia Conceptualising skills development in the informal sector	Felix Maringe An overview of studies exploring systemic issues related to the South African post-school sector		
Joan Roodt National database sets and research on labour market demand		Peliwe Lolwana Is post-school education adult education and training? The shape and size of post-school education		
Mariette Visser National database sets available for post school sector (supply side)		Michelle Buchler A critical review of research on skills development qualifications structures		
Michael Gastrow Innovation, skills development and South African labour market intelligence		Volker Wedekind Towards responsiveness and employability in the post-school sector		

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INTRODUCTION

Education and labour market planning cannot take place in a vacuum. As the Department of Higher Education's (DHET's) Green Paper for Post-school Education and Training (DHET, 2012: 81) puts it, "The foundation of any planning process is the existence of comprehensive, accurate, integrated and effectively analysed data." The data collection process, however, depends fundamentally on the formulation of indicators – means for measuring and comparing various phenomena. This is the first step in the process of arriving at the kind of data for planning purposes envisaged by the DHET.

The paper begins by defining indicators in general. It then proceeds to discuss "education indicators" and "labour market indicators" in separate sections and considers the data requirements and data quality for the development of an indicator system in each section.

THE OUTLINE OF THE PAPER

- Define indicators, and the goal and purpose of indicators
- Criteria for selecting a good indicator
- What should be measured
 - Higher Education
 - Labour Market Indicators
- Higher Education
 - Purpose of indicators in the HE system?
 - What exists locally and internationally - examples
 - Data sources
 - Quality of data sources
- Labour Market Indicators
 - Purpose of indicators in the LM system
 - What exists locally and internationally - examples
 - Data sources
 - Quality of data sources

1. DEFINITIONS

An indicator can be defined as something that helps us to understand where we are, where we are going and how far we are from the goal. It must be a clue, a symptom, and a pointer to something that is changing. Indicators are presentations of measurements. They are bits of information that summarize the characteristics of systems or highlight what is happening in a system.

Indicators are distinguishable from raw data or a statistic by the fact that they are linked to policy concerns or outcomes. An indicator is not raw data but a synthesis of data that can be analysed (Martin and Sauvageot 2011). Indicators summarize a considerable amount of data, the goal being to present an overview or general indication of the situation being analysed, without necessarily

including comments on whether the situation is positive or negative. Indicators are employed for the following purposes (Martin and Sauvageot 2011):

- To determine the state of an education system (also the state of the labour market);
- To monitor its development and progress over time (compare to, for example, predefined objectives with numbers attached to them);
- To measure its strengths and weaknesses;
- To assess the degree of inequality in the provision of services;
- To inform policy-makers on the functioning and efficacy of the education system (or labour market), but also to report its condition to the entire education community, and indeed to the whole country.

A critical step in defining a suite of indicators is to identify the target audience and purpose for the indicators (Brown 2009). This will help determine the scope of the indicator set and assist in keeping the project focused. Important questions to consider include (Brown 2009):

- Who will be responsible for the final selection and publication of the indicators?
- How will stakeholders be involved?
- Will an expert group be established to provide specialist advice?
- Will public consultation be undertaken?
- How will the indicators be sustained and funded over time?

These are important questions to consider but will not be further addressed in this concept note but will be considered for future research.

2. CONCEPTUAL FRAMEWORK

Indicators used for planning purposes require accurate, relevant and reliable data that informs planners and policy decision-makers on the allocation/provision of resources, and for monitoring trends, deviations and developments.

The ultimate aim of this project is to understand what demand and supply data exist and the quality of the data for the development of education and labour market indicators. In order to determine the type of indicators necessary for the evaluation or assessment of the education and labour market systems, the dependence on quality data is paramount to the success of the project.

Knowledge of the indicator development process and its implementation in international publications will be a valuable tool for building a coherent set of indicators. This will assist in ensuring that the selection of indicators is relevant and balanced and it aids understanding of the complicated links between indicators.

3. SELECTING THE INDICATORS

The process of selecting the indicators is generally an iterative one undertaken in consultation with interested stakeholders. Care is needed in selecting indicators which resonate with the target audience and yet which are technically sound (Brown 2009).

Brown (2009) provides the following criteria for indicator selection:

Table 1 Criteria for indicator selection

Valid and meaningful:	An indicator should adequately reflect the phenomenon it is intended to measure and should be appropriate to the needs of the user.
Sensitive and specific to the underlying phenomenon:	Sensitivity relates to how significantly an indicator varies according to changes in the underlying phenomenon.
Grounded in research:	An awareness of the key influences and factors affecting outcomes.
Statistically sound:	Indicator measurement needs to be methodologically sound and fit for the purpose to which it is being applied.
Intelligible and easily interpreted:	Indicators should be sufficiently simple to be interpreted in practice and intuitive in the sense that it is obvious what the indicator is measuring.
Relate where appropriate to other indicators:	A single indicator often tends to show part of a phenomenon and is best interpreted alongside other similar indicators.
Allow international comparison	Indicators need South African-specific goals, but where possible should also be consistent with those used in international indicator programmes so that comparisons can be made.
Ability to disaggregate over time:	Indicators should be able to be broken down into population sub-groups or areas of particular interest, such as ethnic groups or regional areas.
Consistency over time:	The usefulness of the indicators is directly related to the ability to track trends over time, so as far as possible indicators should be consistent.
Timeliness:	There should be minimal time lag between the collection and reporting of data to ensure that indicators are reporting current rather than historical information.
Linked to policy or emerging issues:	Indicators should be selected to reflect important issues as closely as possible. Where there is an emerging issue, indicators should be developed to monitor it.
Compel interest and excite:	The indicator should resonate with the intended audience.

4. WHAT SHOULD BE MEASURED?

To develop good indicators, it is necessary to identify the phenomena that are most worth measuring. These can depend on a country's choices, inspired by its education policy objectives, or an institution's choices in defining its own plan or project. The relevance of other indicators may be more wide-ranging or more descriptive, but their importance depends on the particular context.

5. HIGHER EDUCATION INDICATOR SYSTEMS

Planners at both the national and institutional levels need to construct an indicator system that matches their current policy or plan in progress.

Martin & Sauvageot (2011) contends that a higher education indicator system cannot be developed without two prerequisites being fulfilled. The first is possession of a functioning information system that contains basic information reliable enough to develop the indicators. An indicator system is not the first step but rather the end result of a functioning information system that can make good use of data and communicate them clearly. The second prerequisite is a policy or plan that is sufficiently explicit and clear, providing a foundation upon which an informative indicator system can be constructed.

For most countries, the appearance of indicators and indicator systems in higher education constitutes a response to two policy objectives: exercising more rigorous monitoring in this field and, in times of fiscal restraint, establishing a more direct and observable link between funding and performance. The goal of using a system of indicators is to make the autonomy and diversification of higher education institutions compatible with accountability and effective management of these institutions. Indicators thus provide a means of not only external monitoring of these institutions by governments, but also internal monitoring of overall institutional goals or specific ones set by departments or service units (Martin & Sauvageot 2011).

The authors distinguish three specific uses of indicator systems in higher education systems: 1) informing the general public or government on the status of the system; 2) monitoring the progress of a policy, strategy, or plan that has been implemented (or one of its components); and 3) managing the higher education system or an institution as a whole.

5.1 What should be measured?

Martin & Sauvageot (2011) proposes the following themes and indicators for analysing the performance of higher education systems:

Table 2 Suggested themes and indicators for analyzing the performance of higher education systems

Theme	Indicators
Access: Widen access; control incoming student flow	Transition rate from secondary school to higher education, Proportion of an age group entering higher education, Gross enrolment ration.
Internal efficiency: Not all students who enter a higher education obtain a qualification.	Graduation rate for a first qualification in higher education, Success rate by average number of years spent in higher education, Dropout rate by programme of study and type of secondary school qualification.
Relevance and external efficiency: Development of links between HE and the economy. What happens to students after they leave HEIs?	Employment rate of graduates from higher education, Unemployment rate of graduates from higher education, Proportion of graduates from higher education institutions with a job as a percentage of people 25-64 years of age, Salaries and wages of graduates from higher education.
Quality of education	What are the quality assurance policies for higher education systems?
Capacity for research and development: Measure research and innovation capacity	Number of publications Number of patents Expenditure and staff related to research and development
Equity: Reducing inequalities in access to	Entry into higher education, Participation in higher education,

Data considerations for education and labour market indicators

and success in higher education	Retention, and Success
Costs and expenditures	Public expenditure on higher education as a percentage of GDP, Public expenditure on higher education as a proportion of total government spending, Average expenditure per student in higher education, Average expenditure per graduate of higher education, The relative shares of public and private expenditure on higher education.

Source: Martin and Sauvageot (2011) Table created by HSRC authors.

The table above is constructed from what the authors consider the recurring themes in their investigation of indicator systems within higher education institutions and countries. The next subsection refers to the development and application of higher education indicators in the South African context using official statistics.

5.2 Council for Higher Education and Training

The purpose of the CHET interactive HEI database is to make performance indicator data available on-line to enable university councils to better assess their performance relative to the Minister's targets, to their own institutional targets and to the performance of their peers. This data tool will also be of use to higher education researchers, analysts, policy-makers and other decision-makers seeking a more detailed, empirically-based picture of South African higher education (CHET Website).

The table gives the indicator number (as displayed on the website), the indicator description and the theme in which it falls according to Martin & Sauvageot's organisation of themes.

Table 3 Centre for Higher Education Transformation Performance Indicators

Indicator	Indicator Description	Theme
01 and 03	Enrolments	Access
02	Head count enrolment growth (annual averages)	Access
04	Enrolments by qualification type	Access
05	Enrolments by major field of study	Access
06	Enrolments by race group	Access and Equity
07	Enrolments by gender	Access and Equity
08	Success rates	Internal Efficiency and Equity
09	Actual graduates	Internal Efficiency
10	Graduates as % of total head count	Internal Efficiency
11	Administrative to academic staff ratio	
12	FTE student to FTE staff ratio	
13	Academic staff with doctorates	Capacity for Research and Development

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14	Ration of research publications units to academic staff	Capacity for Research and Development
15	Weighted total research output per academic staff member	Capacity for Research and Development
16	Income/expenditure form all activities	Costs and Expenditure
17	Surplus/deficits on all activities	Costs and Expenditure
18 and 19	Sources of income	Costs and Expenditure
20	Expenditure per graduate	Costs and Expenditure

Source: CHET website, <http://www.chet.org.za/inidicators>

Data for CHET's online performance indicators were obtained from the Higher Education Management Information System (HEMIS) of the Department of Higher Education and Training. The disclaimer on the CHET website cautions users that the quality of the HEMIS data is dependent on the accuracy of the institutional data submissions.

5.3 Sources of data

The quality of the indicators therefore depends on the quality of data collected in higher education institutions. The greater autonomy of the institutions makes it all the more important to maintain data compilation at the national level by the government (Martin & Sauvageot 2011).

The main source of data for the analysis of Higher Education Institution graduates in South Africa is the Higher Education Management Information System (HEMIS) which, under the custodianship of the Department of Higher Education and Training (DHET), is the repository for management information submitted by each higher education institution on an annual basis.

In the form that it is received from the institutions, the data is not based on individual unit records (Paterson and Arends 2009). In other words, the data simply reports the total number of students who are enrolled in a particular year and the number who graduate in the same year. This means that neither the progress of individual students, nor the progression of specific student cohorts can be tracked from year to year. This is the work of tracer studies.

National data on student enrolments and graduations is organised according to the Classification of Education Subject Matter (CESM) system. CESM is a single, standardised scheme according to which enrolment and graduation of students studying in different subject matter/study fields can be compared. The CESM system needs to be updated to reflect changes in knowledge and study fields (Paterson and Arends 2009).

6. LABOUR MARKET INFORMATION AND INDICATORS

Countries in southern Africa have recognised the need for adequate information to support new labour market policies and programmes. Available information on labour market development in southern Africa, however, is often fragmented, limited in scope or outdated (Sparreboom 1999).

Sparreboom (1999) defines labour market information as follows:

Statistical and non-statistical information concerning labour market actors and their environment, as well as information concerning labour market institutions, policies and

regulations that serves the needs of users and has been collected through the application of accepted methodologies and practice to the largest possible extent.

Definitions of Labour Market Information

Woods and O’Leary (2006) cite LMI definitions from a range of literature:

The ILO defines LMIS as “any information concerning the size and composition of the labour market or any part of the labour market, the way it or any part of it functions, its problems, the opportunities which may be available to it and the employment-related intentions or aspirations of those who are part of it.” (Thuy et al. 2001, p57 cited by Wood and O’Leary 2006).

Employment policy administrations in some regions of Northern Ireland, use the phrase “labour market intelligence” rather than labour market information to convey the idea that information has been analysed and reduced to essential facts relevant for decision making (Lantra 2005 cited by Woods and O’Leary 2006).

Work futures. British Columbia, without fully defining LMI, adds additional perspective to a possible definition: “The traditional definition of LMI refers to descriptive and statistical information about occupations, wage rates, unemployment rates, employment outlooks, education and training, and economic trends and conditions. However, as LMI is becoming more essential to career development, its definition has expanded. LMI now refers to any information that is used for labour market-related planning and decision making. This is an important change because it recognizes that LMI is part of the career planning process. As work and life become more intertwined, information about how the labour market works should be part of every stage of career planning.” (HRSDC:BC/Yukon 2006 cited by Woods and O’Leary 2006)

In the United States, the Workforce Information Council uses the term *workforce information* to encompass both labour market and workforce information and provides the following general definition: The workforce information system “provides information on labour market trends and conditions, job outlook and wages, skill requirements of jobs, and a wide variety of other information that helps customers make decisions about their businesses, careers, training, and job search.”

The authors employ the following working definition for their study:

Labour market information includes any quantitative or qualitative information and intelligence on the labour market that can assist labour market agents in making informed plans, choices, and decisions related to business requirements, career planning and preparation, education and training offerings, job search, hiring, and governmental policy and workforce investment strategies.

Key components of an optimal LMI system include: the types of data, quality standards for data, level of detail, analytical enhancement of data, and information dissemination strategies and mechanisms (Woods and O’Leary 2006).

6.1. Key Indicators of the Labour Market (ILO-KILM)

The most widely accepted and used set of indicators on the labour market is KILM – Key Indicators of the Labour Market (ILO, 2011). KILM is a collection of 18 “key” indicators, touching on: employment and other variables relating to employment (status, sector, hours, etc.); the lack of work and the

characteristics of jobseekers; education; wages and compensation costs; labour productivity; and working poverty. Taken together, the KILM indicators provide a strong foundation from which to address key questions related to productive employment and decent work. Table 4 sets out the KILM indicators, which are organised by chapter.

The primary objectives of the KILM programme set for it in 1999 were: (1) to present a core set of labour market indicators; and (2) to improve the availability of the indicators to monitor new employment trends. But that is not all that the KILM has to offer. It has evolved into a primary research tool that provides not only the means for analysis, i.e. the data, but also guidance on interpretation of indicators and data trends.

The selection of the indicators was based on the following criteria: (a) conceptual relevance; (b) data availability; and (c) relative comparability across countries and regions.

Table 4 Key Indicators of the Labour Market (ILO-KILM)

No.	Indicator
KILM 1.	Labour force participation rate
KILM 2.	Employment-to-population ratio
KILM 3.	Status in employment
KILM 4.	Employment by sector
KILM 5.	Part-time workers
KILM 6.	Hours of work
KILM 7.	Urban informal sector employment
KILM 8.	Unemployment rate
KILM 9.	Youth unemployment
KILM 10.	Long-term unemployment
KILM 11.	Unemployment by educational attainment
KILM 12.	Time-related underemployment
KILM 13.	Inactivity rate
KILM 14.	Educational attainment
KILM 15.	Real manufacturing wage trends
KILM 16.	Hourly compensation cost
KILM 17.	Productivity and unit labour cost
KILM 18.	Poverty and income distribution

Source: Sparreboom (1999, 23), Appendix 3

6.2 Data Foundation for an Optimal LMI System: Summary

The data sets included in a LMI system are the heart of the system. They define the types of and degree to which labour market-related planning, questions, and issues can potentially be addressed. While adequate data alone are not sufficient to ensure an optimal LMI system, they are necessary for an optimal system. The data contents of the system define both the breadth and constraints of issues and information that can be analyzed and delivered to various customer communities.

Woods and O’Leary (2006) organises data sets by six categories for consideration in building an optimal LMI system:

- 1) core labour force and market data,
- 2) demand data,
- 3) occupational supply,
- 4) occupational characteristics,
- 5) education and training information, and
- 6) crosswalks and linkages across different data sets.

Labour market information should fulfil a number of requirements to serve the needs of users. Examples of these requirements are the accessibility, comprehensiveness, timeliness, regularity, scope & coverage, accuracy, and presentability of the information stored (see e.g. Young 1993). The detail of the data will vary for many different reasons including user requirements, costs of developing data, and methodological considerations.

The most critical issues that must be considered in collecting and compiling labour market data are

- time period coverage,
- geographical coverage and detail,
- measurement criteria and methods,
- classification of data, and
- other data-related issues, in addition to the above primary factors that relate to every data element in the LMI system there are additional considerations, including
 - timeliness;
 - accuracy;
 - crosswalks/link: (the system must include tools to link or crosswalk data from different sources);
 - establishment of data standards; and
 - the employment of multiple data development approaches in building LMI data bases, including the use of qualitative data.

Operation information systems are key for the collection of data for both higher education and labour market information systems. The following section considers the importance of a good information system and the quality features that should be essential to such a system.

7 AN OPERATIONAL INFORMATION SYSTEM

Without a good information system, it is impossible to build a set of relevant indicators and in turn an indicator system based on them (Martin & Sauvageot 2011).

An information system is costly. Information that is little or never used has a much greater chance of losing its reliability and utility in terms of the need to have it within a certain time frame or being able to validate it. This is why the quality and quantity of information are low.

Lievesley (2003) argues that the term quality as applied to 'official' statistics is not easily defined, being comprised of many components, which include:

Validity: The extent to which the data are measuring what they purport to measure without the presence of bias.

Reliability: The amount of (random) error present in the data.

Relevance to policy: In the context of educational data these may be local, national or international policies. A tension can exist between the relevance for national and international policies particularly in respect to the importance of harmonised classifications.

Potential for disaggregation: It is vital to understand - in order to reduce - inequities across the world in relation to access to good education. Relative disadvantage may occur within countries and is not completely captured by examining differences between countries. It is therefore important to measure variability within countries and this requires that data can be disaggregated by key variables. The current emphasis on international monitoring of national level indicators undervalues disaggregated data.

Currency: The availability of data relating to recent time periods is of critical importance if policy decisions are to be based on this evidence. Obviously this is more important in situations where there is a greater amount of change. The regularity of monitoring ought to take into account the rate of change of a variable.

Punctuality: The collection of recent data is insufficient; they must also be processed speedily and access provided in a timely and regular fashion preferably with reliable release dates which are publicised in advance so that users know when to expect the new data to be available. This also helps to guard against the withholding of data for political purposes which must be seen to be unacceptable.

Coherence across different sources: Since the value of combining data of different types and from different sources is increasingly recognised their coherence is important so that they provide a representative and comprehensive picture of education.

Clarity and transparency with respect to known limitations: Metadata, which describe the methodologies used for data collection and outline the various sources of error, are vital in order that the user can judge the quality of the data and thus determine whether they are fit for their purpose.

Accessibility and affordability: The quality of information extracted from data improves the more the data are subjected to analysis from a variety of perspectives. Thus it is important to create a culture in educational institutions, and in societies more generally, in which access to data is regarded as the norm. A pre-requisite for this is a climate of openness in which criticism of data collection or analysis is factual and temperate, and data are used responsibly.

Comparability through adherence to internationally agreed standards: Otherwise comparability will only be 'skin deep' and unjustified conclusions may be drawn which are artefacts of the variations in methodologies between countries rather than 'real' differences. However international standards have to be sensitive to inherent heterogeneity which can represent a genuine obstacle to the attainment of comparable data.

Consistency over time and space: Methodological consistency is critical when making comparisons over time or between different areas or when aggregating data across time periods or across areas. Difficult compromises must often be made between preserving methodologies over time and updating them to keep abreast of advances in statistical science and of policy developments. For example the retrospective analysis of educational change has been complicated by the introduction of ISCED 97.

Efficiency in the use of resources: It is feasible to reduce many of the biases or variability in the process of gathering statistical data by spending more time or money, thereby achieving data of higher quality. However resources are usually limited and the aim must therefore be to minimise error within a fixed outlay of resources. Occasionally we might seek to minimise costs to achieve data of a specified quality.

Therefore, considerable methodological and organizational work must be conducted before indicator systems can be developed.

8 USING INDICATORS FOR INTERNATIONAL COMPARISONS

International comparisons are increasingly being used in governments' analysis of their education systems. Many national publications include international comparison indicators to provide information on the state of the country's education system compared to those of other countries. This is also the case for higher education institutions, which have included international indicators or their own international or national rankings in their own indicator systems.

Experience of the UIS to date has highlighted many problems with the quality of education data. Many of these problems are similar to those experienced in relation to other areas of statistics and are not specific to education data. The problems include:

- The inability of some countries to provide any data at all
- Incomplete data over time
- Incomplete data within a country – with data relating to particular areas such as private education, or to particular parts of the population such as migrant groups, particularly difficult to obtain
- Inconsistencies of data within a country – especially where the data have been supplied by different ministries, a particular problem being mismatches between population data used in the education ministry, those supplied by the national statistical agency and those distributed by the UN Population Division which is the lead UN agency for population data
- Inadequate implementation of the international standards and classifications leading to data which are not comparable across countries
- Changes in the use of international classifications which lead to inconsistent data over time
- Poor or incomplete metadata and, in particular, the absence of information on quality of the data
- An over-reliance on data from administrative sources and the lack of other data with which to validate information
- Long time lags before data are processed and available

9 IMPROVING DATA QUALITY

Lievesly (2003) provides some suggestions regarding improving data quality at the international level which is just as relevant at the national level.

It is essential that quality assurance processes should be developed and made explicit to identify weak data and to help countries take remedial action. The development of quality assurance processes capable of identifying weak or suspect data would be facilitated by the availability of

multiple sources of data so that inconsistencies can be identified. This process is sometimes known as 'triangulation'.

Support for data collection is contingent upon data use. The more that data are used for national purposes, so that policy makers see a need for them, the more they will ensure that resources are available for data collection. Thus there two imperatives to help researchers within countries to have access to their own data: a) to ensure local commitment to the activity and b) because ideally data should be analysed by those who understand their provenance.

Using indicators for analysis can help to improve information systems, in terms of both the volume and the reliability of the information generated. The publication of an indicator system constitutes feedback for people who produce information, such as those responsible for statistics in a higher education institution. Indicators can also demonstrate to what degree the data being collected are important, useful, and actually being used, which can give statisticians and administrators greater motivation to provide precise information, fill out the questionnaires correctly, and present accurate and reliable data. It is by publishing and using data, with the necessary precautions, that data quality can improve.

10 CONCLUSION

Indicators are designed to simplify information for users, not to overwhelm them. It is likely that a long list of indicators will be produced through the process of identifying potential indicators for the LMIS project. For the purpose of the study the final suite should comprise around 20 to 30 indicators.

Existing data sources should and will be used to support indicator development. These may include data sources that are held by the government such as the DHET's HEMIS and the Department of Labour's Public Employment Systems data, data held by other government agencies such as research councils, and data held by the private sector.

Research will focus on the challenges to access and analyse these data sources such as: sector specific data and available at the local government level; availability of data at specific intervals; possible restrictions on confidentiality and privacy; availability of data in some geographic areas and not others; definitions of certain concepts; data based on a survey sample (degree of inaccuracy).

Other considerations for future research will be assessing the quality of data in information systems and other sources mentioned above.

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