PROPOSED METHODOLOGY FOR REPORTING INDICATOR 1.a.2: PROPORTION OF GOVERNMENT SPENDING ON ESSENTIAL SERVICES (EDUCATION)

Abstract
Recent reviews of the coverage and quality of SDG 1.a.2 (public expenditure on education as a proportion of total government expenditure) have found (1) low coverage of the indicator, (2) inconsistencies between what the government reports to UIS versus the IMF and other sources, and (3) inaccurate reporting of education expenditure to the UIS. This note presents two proposals for updating the indicator methodology to address these issues: (1) the uses of multiple sources of expenditure data combined with an imputation method to produce a best estimate and (2) improving UIS's data collection process combined with using publicly available budget documents as the source. Pros and cons of each option are discussed.

1. How the indicator is currently reported

UIS collects education expenditure data through Section B of the *Survey of Formal Education*[1]. The survey respondent is typically a government staff member in the national education ministry or one of the national education ministries if there is more than one. Section B asks the respondent to report amounts of various types of education expenditure, and the questionnaire is quite involved: if the respondent were to provide an amount for every type and classification of expenditure requested, then she or he would have entered a total of 360 different amounts into the forms. Note that for OECD countries, they provide data on expenditure through the UOE survey conducted jointly by the OECD, UIS and Eurostat.

The UIS expenditure questionnaires ask for expenditure amounts across two dimensions: type of expenditure and level of expenditure. There are 40 different types of expenditure which include both public and private expenditure on education. Under public expenditure, categories include expenditure on public and private educational institutes, intergovernmental transfers, expenditure by regional and local governments, subsidies to households as well as amounts for staff compensation, recurrent and capital, expenditure, among others. There are nine levels of education from early childhood development up to tertiary including a category for expenditure that is not distinguishable by level.

Providing the education amounts requested in the questionnaire generally requires the respondent to do research and make a number of calculations: educational expenditure often occurs not only at more than one level of government (e.g.: national versus provincial versus local) but also by multiple ministries, including ministries responsible for specific industries having their own vocational colleges and social ministries providing direct subsidies for education to poor households, among many others. Then, there is the issue of what constitutes educational expenditure (e.g.: expenditure on goods and services versus financial instruments), the definitions of the various types of expenditure (recurrent versus capital), and how to allocate amounts by level when data sources on expenditure are aggregate. These definitions and methodologies are presented in Section 5 of the Instruction Manual Survey of Formal Education[2].

While this description of the data collection process may sound cumbersome, particularly if the interest is solely on SDG 1.a.2, it is important to note that the rich data being collected is crucial for a variety of applications in the development of countries' education sectors. For example, data on recurrent expenditure is used in cost-benefit and fiscal sustainability analyses of investment projects in the educations sector, particularly by the multilateral development banks. The ability to compare outcomes relative to the appropriate costs across countries is central to comparative analysis of the efficiency of education systems.

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[1] see http://uis.unesco.org/uis-questionnaires
[2] see http://uis.unesco.org/en/methodology

2. Issues with current reporting in practice

The UIS has recently conducted a number of studies related to the reporting of SDG 1.a.2, and the following three issues have been identified: low response rates, mismatch between figures reported to UIS and reported elsewhere by countries, and reporting errors.

Low response rates

A study for the TCG Working Group on Expenditure Data in 2020[3] calculated the availability of data points for public education expenditure as a percent of total government expenditure (SDG 1.a.2) and as a percent of GDP. Nearly two thirds of countries globally have at least one data point in the five years prior to 2020; however, less than one third of countries have sufficient data for a trend, that is three or more data points in the past five years (Table 1). There is also significant variation by region; for example, only 14 percent of countries in Northern Africa have at least one data point in the past five years while 86 percent of countries in Central and Southern Asia have at least on data point. 71 percent of Central and Southern Asian countries have sufficient data points for a trend compared to zero for Northern Africa and Oceania.

Table 1: Availability of education expenditure indicators and their trend by region (%)

Indicators	World		Africa (Northern)		Africa (Sub-Saharan)		Asia (Central and Southern)		and South-eastern)		Asia (Western)		and the Caribbean		America and Europe		Oceania	
	Data availability in last 5 years (%)	Trend(%)	Data availability in last 5 years (%)	Trend(%)	Data availability in last 5 years (%)	Trend(%)	Data availability in last 5 years (%)	Trend (%)	Data availability in last 5 years (%)	Trend (%)	Data availability in last 5 years	Trend (%)	Data availability in last 5	Trend(%)	Data availability in last 5	Trend (%)	Data availability in last 5	Trend (%)
Public expenditure in education as a % of total government expenditure	63.6	30.4	14.3	0.0	77.1	58.3	85.7	71.4	61.1	33.3	44.4	16.7	61.9	31.0	74.5	10.6	30.0	0.0
Public expenditure in education as a % of total GDP	63.6	30.4	14.3	0.0	77.1	58.3	85.7	71.4	61.1	33.3	44.4	16.7	61.9	31.0	74.5	10.6	30.0	0.0

Source: UIS 2020. *Producing internationally comparable education expenditure data: data sources, coverage, and challenges*. Montreal: UIS. pp. 4

Multiple and conflicting figures for the same country

There are a number of different sources for data on SDG 1.a2 public education expenditure as a percent of total government expenditure (SDG 1.a.2) and as a percent of GDP. These sources, in addition to the UIS, include the World Bank's BOOST programme which provides both indicators by country in a dataset as well as the IMF's Government Finance Statistics database. Two additional sources that are not in the format of a database but may provide

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[3] http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2020/10/WG-F-3-Education-expenditure-data.pdf

data are the World Bank's Public Expenditure Reviews (PERs) for the education sector and the Education Country Status Reports (CSRs) supported by the IIEP. Note that figures from all five of these sources are official in the sense that they are either reported to the UIS by the government or are based on government expenditure data; however, in practice there is considerable variation. For example, the UIS data reports that public expenditure on education as a percent of GDP in Albania for 2013 was 3.5 percent. For the same year, this figure was reported by the IMF to be 3.4 percent and by the World Bank's BOOST program to be 3.3 percent. The variation in this figure (as well as for education expenditure as a percent of total government expenditure) is due either to differences in the numerator (the total government expenditure on education) or on the denominator (GDP or total government expenditure).

The main source of variation, however, appears to be in the numerator: total public expenditure on education. A comparison of the figures for total public expenditure on education reported to the UIS from its government respondents and calculated by the IMF revealed that 44 percent of the country-year comparisons had figures that differed by more than 10 percentage points (**Table 2**). A review of the definitions and methodology used by the UIS and IMF found very minor differences that were unlikely to explain the large differences in numerators between these two sources.

Table 2: Comparing UIS and IMF data on total public expenditure for the same year and country

Absolute difference between government expenditure on education reported by UIS and IMF (in percentage points)	Percent of sample (year/country combinations) whose difference fell in the bound
0% to 1% difference:	12% of sample
1% to 5% difference:	22% of sample
5% to 10% difference:	21% of sample
10% to 50% difference:	44% of sample
50% to 100% difference:	1% of sample

Note: The number of observations (country-year comparisons of the two sources) was 759

Reporting issues

A number of reporting issues have been identified by the UIS. These include omission of expenditure on education by non-education ministries, omission of expenditure by sub-national levels of government, the use of internal expenditure reports that do not correspond to amounts reported in budget documents, etc. For example, education expenditure as a percent of GDP for Bangladesh based on government education expenditure reported to UIS in 2016 was 1.5 percent; however, this amount appears to only include expenditure by the Secondary and Higher Education Division. Using budgeted amounts for this ministry and the Ministry of Primary and Mass Education Division, expenditure as a percent of GDP would be 2.1 percent. The reasons why reporting issues such as these occur is not presently well understood. However, when education expenditure spans more than one ministry, and especially when substantial shares of public education expenditure occur through non-education ministries, the UNESCO respondent may not be able to access expenditure data outside her or his own ministry. In the case of Bangladesh, for example, expenditure data is generally not published in the publically available budget documents. A respondent based in the Division of Secondary and Higher Education may, for example, have access only to expenditure data for that particular division.

3. Proposed approach

A two-phased approach is proposed to address these issues

> **Phase 1: Data mining and modeling** is proposed to address the immediate need to increase the number of data points and combine the multiple figures for each country and year
>
> **Phase 2: Updating the data collection process and standardization of sources** is proposed to address the longer term need to facilitate and improve the quality of expenditure data being reported to the UIS

### 3a. Phase 1: Data mining and modeling

Data mining already completed: The UIS has undertaken a data mining project[4] to collect data from a variety sources in order to increase coverage for SDG 1.a.2. The sources of data that were used were the existing data in the UIS database, the IMF's Government Finance Statistics database, the World Bank's BOOST dataset, the publically available collection of World Bank Public Expenditure Reviews, Education Country Status Reports (CSRs) supported

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[4] see http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2021/06/Filling-the-data-gaps-for-Expenditure-Data-Proposal-from-the-UIS-TCG-Secretariat.pdf

by the IIEP, and the national budget documents. This has increased the number of countries with data over the study period from 2015 to 2020 (Figure 1).

Figure 1: Number of countries with data by source
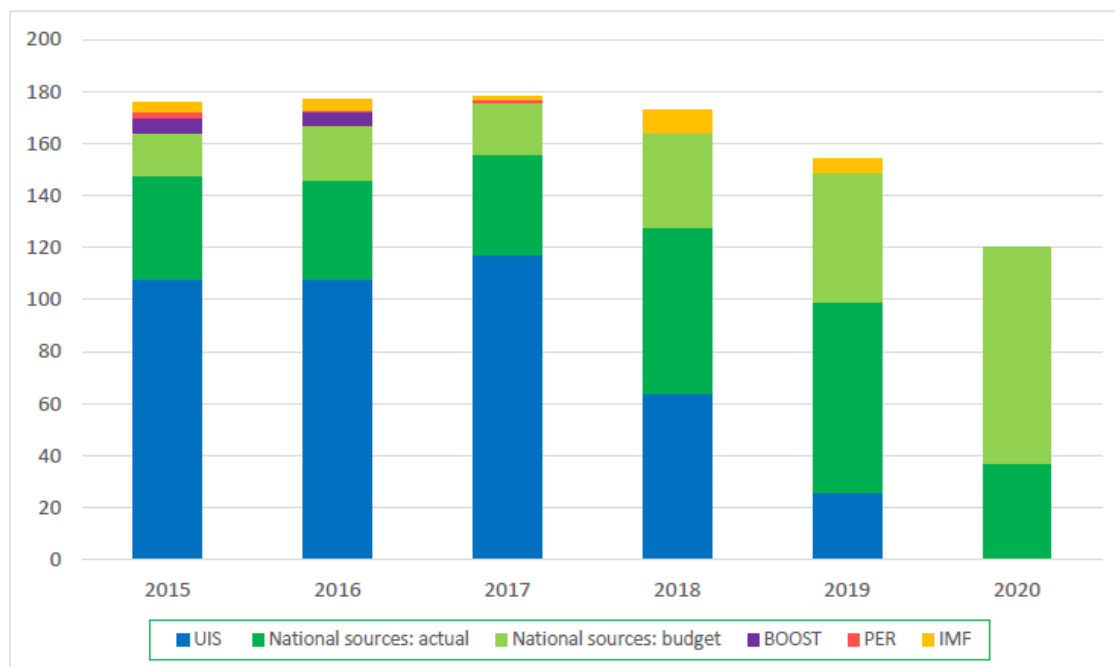
Note: blue indicates the number of countries with data in the UIS database and non-blue colours indicate the increase in data availability for each of those years.

Objective: The purpose of this proposed approach to improving SDG 1.a.2 coverage would be to model the indicator based on the mined data (both now and in the future) from the various sources.

Modeling: In order to generate an estimate of SDG 1.a.2, a modeling approach would need to be developed that can combine multiple sources for each country. The modeling approach would need to be able to generate estimates for countries when different combinations of sources are available and be able to handle the addition or removal of sources for countries.

Implementation: historical data from numerous data sources has already been mined, the next steps are to create a model to generate and estimate of the SDG 1.a.2 and then to repeat the mining exercise periodically and use the model to generate estimates going forward.

Pros:

1. increases coverage with data and trends
2. provides historical data points
3. takes advantage of multiple official data sources to estimate
4. historical dataset with mined data (not modeled) already available

Cons:

1. relies on UIS to collect data and produce indicator (i.e.: some recurrent cost to UIS)
2. estimates based on modeling will be sensitive to modeling methodology
3. may reduce government ownership as the resulting modeled estimates would not correspond to an official source

3b. Phase 2: Updating the data collection process and standardization of sources

Objective: The purpose of updating the data collection process is to (1) simplify the response process for the respondent to improve response rates and quality and (2) to ensure expenditure amounts are based on comparable sources across ministries or levels of government, and (3) to improve understanding of the source of data used and calculations for reporting.

What would be the differences with the current survey? The proposed revised questionnaire would collect the same information as currently used by the UIS; however, there would be differences to the structure of the questionnaire and to the sources used by the respondent to ensure comparability:

1. A step-by-step approach to walk the respondent through the data collection process allowing for
   a. (a) clarity on sources,
   b. (b) prioritization of data requests, and
   c. (c) reduction in the computational burden required by the respondent.

2. Ensure comparable sources of data across government entities within a country for reporting total education expenditure but with flexibility on the source (e.g.: ideally using UIS definitions but allowing expenditure reported in national budgets or even budgeted amounts depending on what is available).

Overview of the proposed data collection process: Data collection would be implemented as a series of steps to walk the respondent through the questionnaire. The core steps would be

> **Step 1:** List all government entities (including ministries and level of government if education expenditure is not included in central government expenditure) that have education expenditure.
>
> **Step 2:** Select a source of expenditure data from a pre-defined, ranked list that is available for each of the government entities identified in Step 1. The questionnaire would require the respondent to use the same source for expenditure data from each of the government entities (and total government expenditure), to ensure that sources are compatible with each other. The list would also be ranked to maximize the reliability of data being reported; the ranking would prioritize MoF expenditure datasets (e.g.: BOOST or equivalent) followed by expenditure data reported in official budget documents or reports, followed by budgeted expenditure data in official documents. For example, the questionnaire may be structured as follows:
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> > **Question 2.1:** Is *actual expenditure* on education available to you from a government expenditure dataset (e.g.: BOOST or equivalent database) for all entities listed in Step 1? Yes/No. If yes proceed to Step 3 and respond using data from this source only; otherwise, continue to question 2.2.
> >
> > **Question 2.2:** Is *actual expenditure* on education available to you from official budget documents or official reports from the national ministry of finance (or equivalent) and sub-national finance ministries or departments if applicable for all entities listed in Step 1? Yes/No. If yes proceed to Step 3 and respond using data from these sources only; otherwise, continue to question 2.3.
> >
> > **Question 2.3:** Is *final/revised budgeted* expenditure on education available to you from official budget documents or official reports from the national ministry of finance (or equivalent) and sub-national finance ministries or departments if applicable for all entities listed in Step 1? Yes/No. If yes proceed to Step 3 and respond using data from these sources only; otherwise, continue to question 2.4.
> >
> > **Question 2.4:** Please continue to Step 3 and make careful note of data sources used in the appropriate fields.
>
> Note that this is an example and the proposal is to develop and pilot an updated data collection process before implementing globally (see implementation note below).

Step 3: Collect data on total education expenditure and total government expenditure (from the same source); this data would provide the necessary data for SDG 1.a.2

Steps 4 and on: Collect data on total education expenditure by level, by level and the various types in the original UIS questionnaire. Note that this would be done for each government entity listed in Step 2.

Implementation: To implement the survey, the first step would be to fully specify the data collection instrument, conduct an internal review with the relevant experts in the UIS, and then conduct a pilot in several countries.

Pros:

1. Expected to increase coverage and data quality as well as meta-data quality
2. Retains government ownership because the numbers are based on (an) official source
3. Replaces the existing UIS questionnaire for expenditure and is expected to be easier for the respondent to report
4. Could be applied to other SDG 1.a2 indicators, particularly Steps 1 – 4 alone, above

Cons:

1. Would not provide historical expenditure data points unless additional requests are made of the
2. Would not be comparable to a country's historical data series if (1) the data source comparability requirement was not met for past data points or (2) spending by government entities other than the education ministries are missing—note that these conditions imply that the previous data points are not high quality.