Basic data on ICT in education in Landlocked Developing Countries (LLDCs), Least Developed Countries (LDCs) and Small Island Developing States (SIDS)

Background

The UIS conducted regional data collections on ICT in education in Latin America and the Caribbean (2010), Arab States (2011), Asia (2012), and sub-Saharan Africa (2013/2014). However despite increasing demand for evidence-based, policy-relevant statistics, the systematic collection of ICT in education data does not currently exist in many LLDCs, LDCs or SIDS. In others, data collection efforts are in their infancy as countries are in the process of adapting national school census forms to include key ICT-related items to shed light on ICT integration and use in schools.

In developed countries, where ICTs are more or less ubiquitous in education, data on participation, progression, usage, and outcomes for ICT-assisted programmes are increasingly available. Typically in LLDCs, LDCs or SIDS, the only data that are available describe the ICT infrastructure and will thus form the basis of this analysis. More specifically, it will include two UIS core indicators on ICT in education: i) the learner-to-computer ratio; and the ii) proportion of schools with Internet, by type. These indicators are used within the statistical framework of the *World Summit on the Information Society (WSIS)* to track progress in the integration of ICTs in schools[1].

Building computer infrastructure: Learner-to-computer ratios (LCRs)

In order to provide advanced forms of ICT-assisted instruction, including computer-assisted instruction (CAI) and Internet-assisted instruction (IAI), sufficient computer resources must be established, keeping pace with demand based on enrolment. The learner-to-computer ratio (LCR) refers to the mean number of total learners sharing a single computer available for pedagogical use in national, aggregate education systems. In summary it is calculated based on total enrolment and the total number of computers available for pedagogical purposes nationally. [2]

While the LCR indicator does not provide information on the intensity of computer usage, it may be considered as a proxy, since there is a relationship between LCR and individual learner time. For example, the higher the ratio, the less time each pupil has access to a single computer.

While the LCR sheds light on current infrastructure to support the integration of CAI or IAI, national-level LCRs mask sub-national differences, which may referred to as the internal digital divide. LCR values are frequently low in urban centres indicating greater access, but high in rural and remote areas indicating scarcity of resources.

Figure 1 shows the LCR in fifteen LLDCs across all regions. It shows that LCRs are very high (i.e. 500:1 or more) in Niger, Lesotho, Nepal and Zambia (primary only). In contrast, there are relatively fewer learners on average sharing a single computer in Botswana, Mongolia and Kazakhstan.

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[1] Target 2 of the WSIS statistical framework aims to "Connect all secondary schools and primary schools with ICTs". http://www.uis.unesco.org/Communication/Documents/measuring-wsis-targets-statistical-framework.pdf
[2] Computers for administrative purposes are excluded from calculating the LCR.

Figure 1: Learner-to-computer ratio in primary and secondary education in LLDCs, 2012
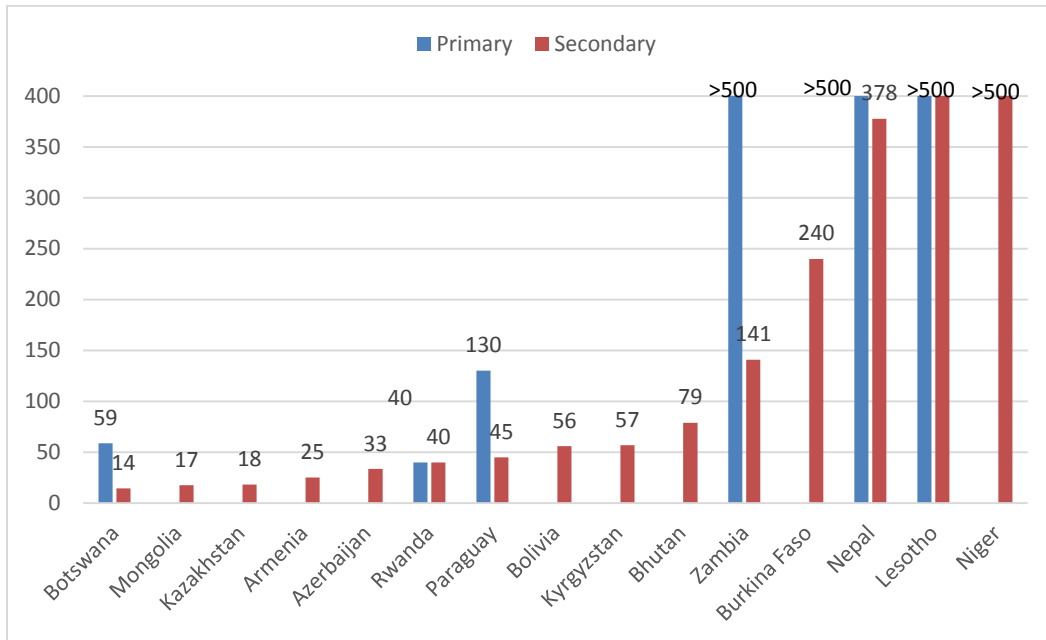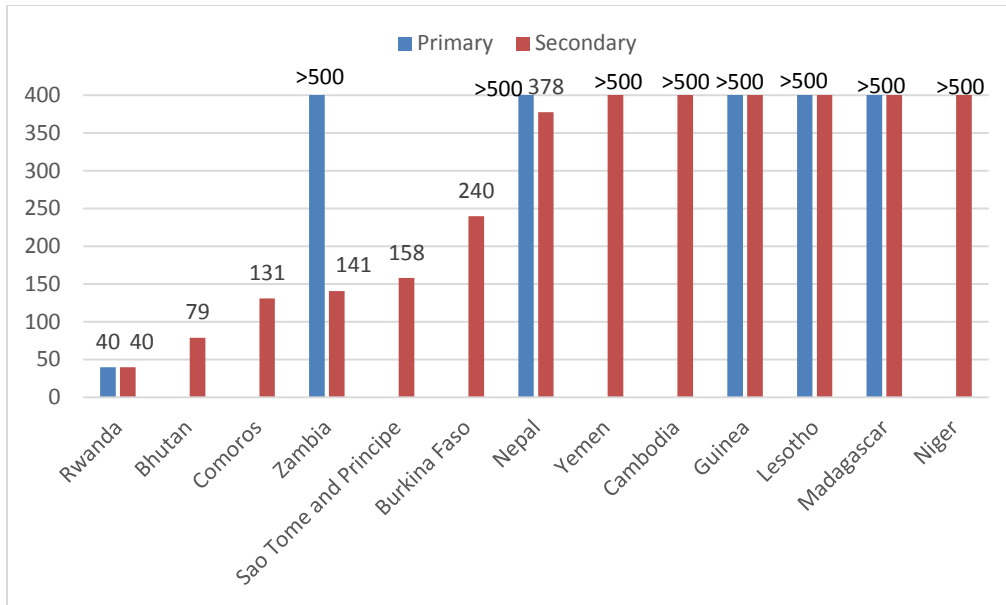

Source: UNESCO Institute for Statistics database, April 2014

Notes: Data for Rwanda, Kazakhstan and Azerbaijan represent public sector schools only. Secondary data for Botswana and Zambia refer to lower secondary. Secondary data for Armenia, Bhutan, Kyrgyzstan and Mongolia include data for primary education. Data for Niger, Burkina Faso, and Botswana reflect 2013; data for Nepal and Kyrgyzstan reflect 2011; data for Paraguay reflect 2010; and data for Bolivia reflect 2009.

Figure 2 shows the LCR in thirteen LDCs. The data show that the LCR is very high, i.e. above 500 learners per computer, in many of the LDCs. The lowest values are found in Rwanda, where there is still only one computer per classroom, on average.

Figure 2: Learner-to-computer ratio in primary and secondary education in LDCs, 2012 or 2013
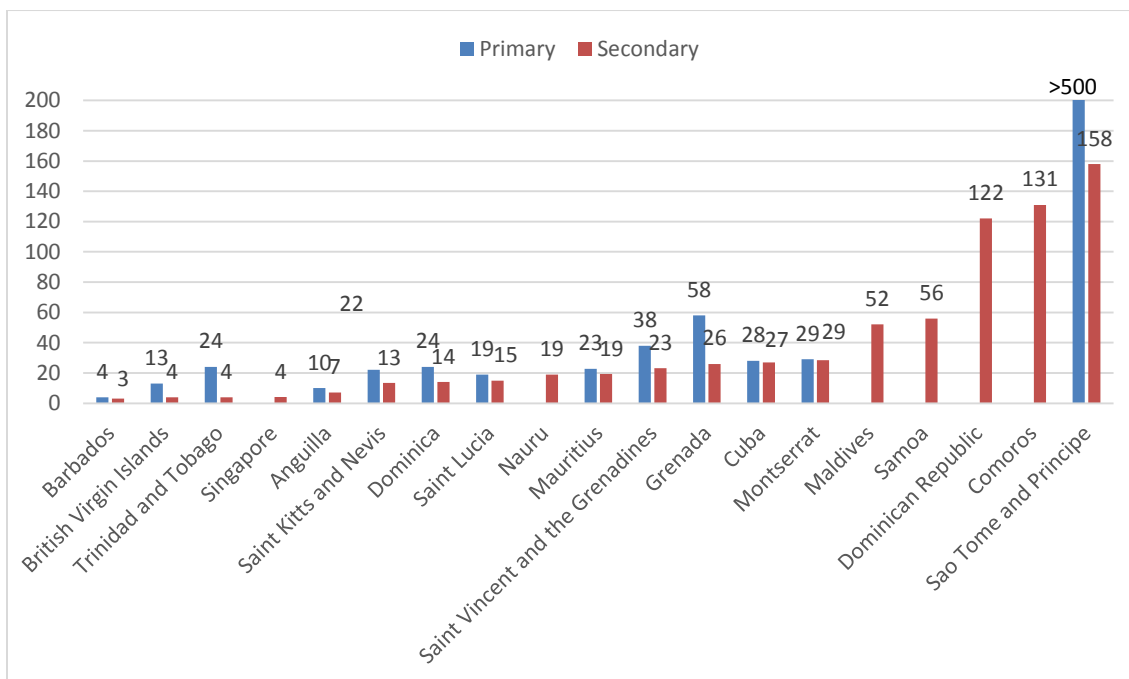
Source: UNESCO Institute for Statistics database, April 2014
Notes: Data for Rwanda and Cambodia represent public sector schools only. Secondary data for Zambia refer to lower secondary. Secondary data for Comoros refer to upper secondary. Secondary data for Bhutan and Yemen include data for primary education. Data for Nepal reflect 2011.

In many SIDS the situation is much better with respect to the learner to computer ratio, as highlighted by **Figure 3**. In particular in many of the Caribbean islands and Singapore, there are many computers available in the classrooms.

Figure 3: Learner-to-computer ratio in primary and secondary education in SIDS, latest year available

Connecting schools to support Internet-assisted Instruction

The proportion of schools with Internet access is central to understanding connectivity. Internet access may be through any wired or wireless device (PCs, laptops, PDAs, tablets, smartphones etc.) using fixed broadband, fixed narrowband or mobile broadband connections. Internet connectivity within schools via privately owned mobile phone networks is excluded. Internet in schools does not however shed light on the intensity of use for educational purposes since Internet may be used only for administration in some schools.

At the most basic level, electrification is a key concern for countries where many schools may not be connected to a reliable source. However, even where there is an electricity supply, ministries of education in some countries often have little or no control over Internet connectivity in schools, which depends on the national telecommunications infrastructure (World Bank, 2010). In some countries, Internet service providers (ISPs) are unwilling to operate in difficult geographic terrain or in rural areas with low population density (ADB, 2012).

Given the vital importance of broadband access, UIS also measures connectivity according to the type of Internet connection. The proportion of schools with fixed broadband Internet[3] access provides a good indicator of the quality of Internet connections and the potential to use ICTs for educational purposes.

Recognizing the importance of broadband Internet to effectively access online resources, the Broadband Commission for Digital Development, whose membership includes UNESCO, ITU and private industry, recently adopted the goal of Broadband for All, particularly for women, girls and marginalized groups. By defining practical ways in which countries, at all stages of development, can achieve broadband connectivity in cooperation with the private sector, the Broadband Commission for Digital Development promotes the importance of universal broadband on the international policy agenda to accelerate progress towards achieving the MDGs by 2015 (Broadband Commission for Digital Development, 2013).[4]
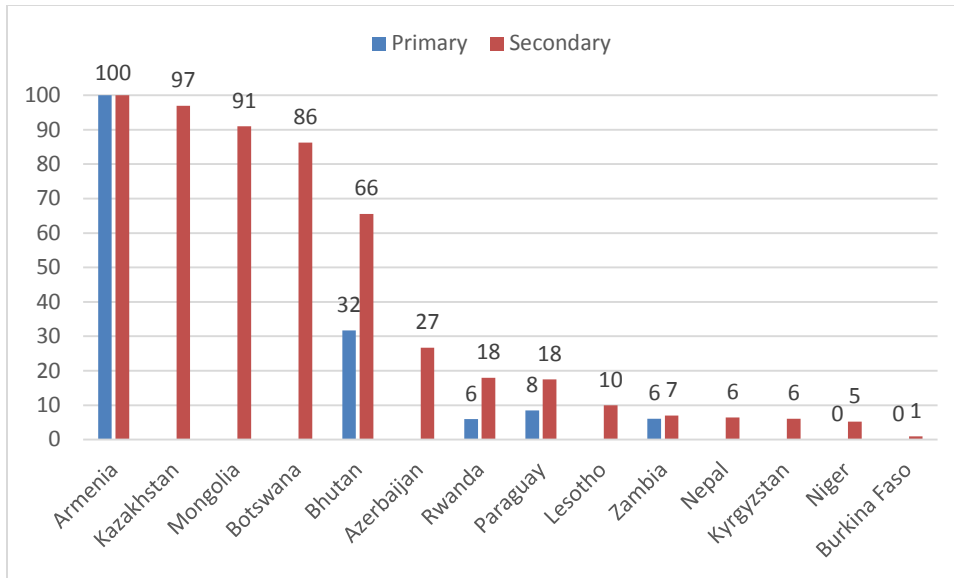
Figure 4 shows that Internet availability varies among educational institutions in fourteen LLDCs. For example, 100 per cent of schools in both primary and secondary education in Armenia have Internet, while it is also present in the majority of schools in other Central Asian countries including Kazakhstan (97 per cent) and Mongolia (91 per cent). Internet is rare though in schools in LLDCs in sub-Saharan Africa including Zambia, Niger and Burkina Faso. Also, despite full electrification of schools in Kyrgyzstan (i.e. 100 per cent), Internet is available in just 6 per cent of secondary level educational institutions. Internet is also uncommon in schools in Paraguay and in Nepal where 9 per cent and 6 per cent of schools, respectively, are connected.

Figure 4: Proportion of educational institutions with Internet in LLDCs, latest year available

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[3] Fixed broadband Internet refers to high-speed connectivity for public use of at least 256 Kbit/s in one or both directions (downloading and uploading). It includes cable modem Internet connections, DSL Internet connections of at least 256 Kbit/s, fibre and other fixed broadband technology connections (such as satellite broadband Internet, Ethernet LANs, fixed-wireless access, Wireless Local Area Network and WiMAX).

[4] In this short note, however, broadband data are not included. These data are available on the website of the UIS.
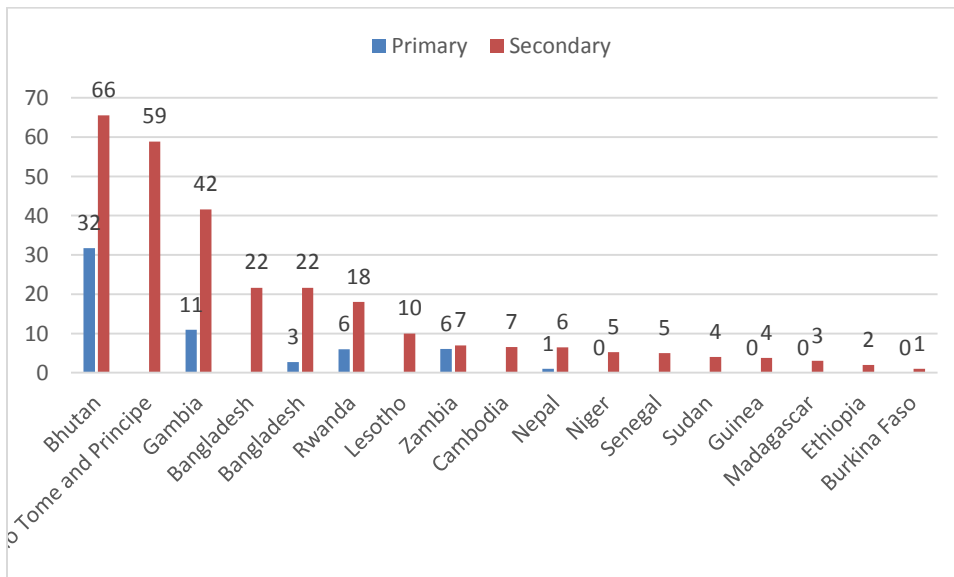
Figure 5 shows that Internet availability in LDCs is generally very low. At primary level, there is virtually no Internet available, while at secondary level, only in Bhutan and Sao Tome and Principe more than half of secondary schools have Internet availability.

Figure 5: Proportion of educational institutions with Internet in LDCs, latest year available
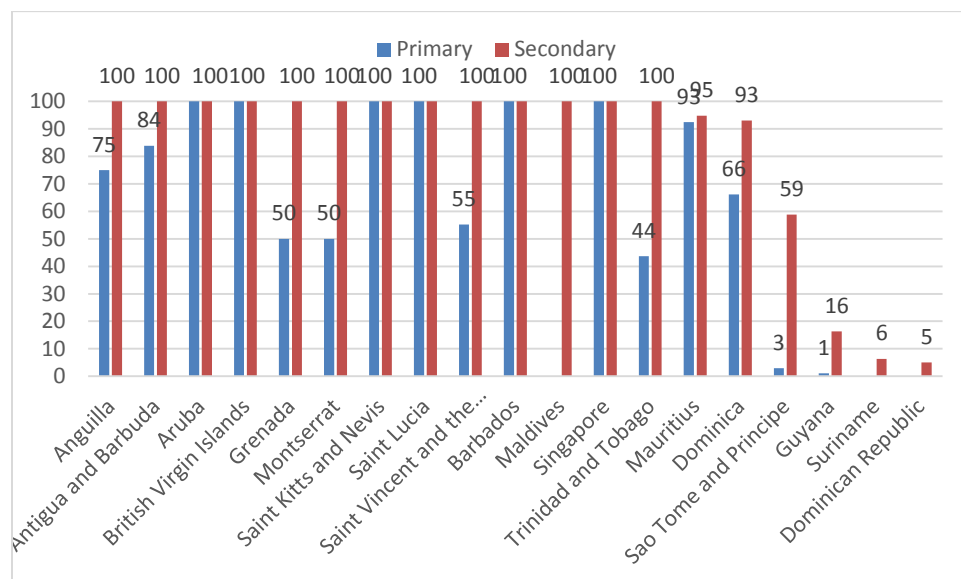
In the SIDS, on the other hand, Internet is generally available in most countries, with the exception of Guyana, Suriname and the Dominican Republic (see **Figure 6**).

Figure 6: Proportion of educational institutions with Internet in SIDS, latest year available

Source: UNESCO Institute for Statistics database, April 2014
Notes: Data for Barbados, Guyana and the Dominican Republic only reflect public sector educational institutions. Secondary data for Maldives, Suriname and the Dominican Republic include data for primary education. Secondary data for Guyana refer to lower secondary.

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