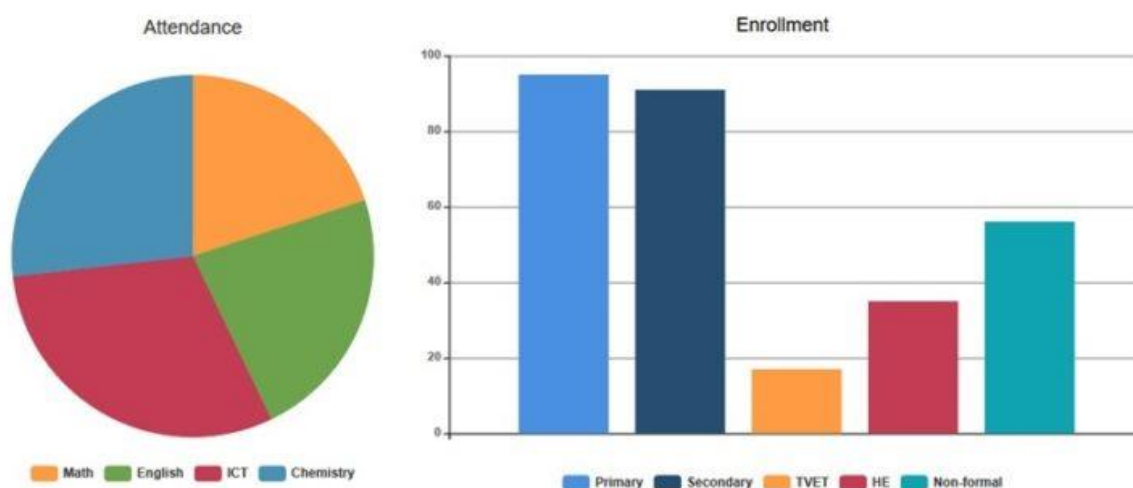# EMIS to monitor ICT in education

Education Management Information Systems

What is the number of interactive whiteboards installed in schools of your city? How many schools use ICT to promote peer collaboration in educational situations? These questions belong to the domain of educational data, and a properly set Education Management Information System (EMIS) should assist in responding them.

An EMIS operating on different levels is an institutional service unit producing, managing, and disseminating educational data, usually within a national Ministry or Department of Education. It is also a set of formalized and integrated operational processes, procedures, and cooperative agreements. By applying this set, data and information about schools and schooling, such as facilities, teachers, students, learning activities, and evaluative outputs, are regularly shared, integrated, analyzed, and disseminated for educational decision making at each level of the educational hierarchy.

Sharing many common indicators, Education Management Information Systems may differ in certain types of operational data to reflect a country context. Considering the local context, the UNESCO entities and other partner organizations focus their EMIS-related projects on current needs of target countries.

In addition to a general re-orientation of EMIS towards inclusive and equitable quality education and lifelong learning, introducing specialized indicators into a national data flow is an effort to observe countries' work towards achieving Sustainable Development Goals (SDGs).

Country-specific needs

UNESCO EMIS-related projects can have specific directions: EMIS for emergencies, Technical and vocational education and training management information systems (TVETMIS), Non-formal education management information systems (NFEMIS), EMIS on students with disabilities, HIV/AIDS response outcome indicators for inclusion within EMIS.

Each of these specialized systems assumes additional EMIS indicators to address certain country-specific needs. They also contribute to aligning programmes administered by different educational stakeholders if based on coherent sets of data.

While planning any interventions into an existing Education Management Information System, it is necessary to evaluate it and benchmark against other member states' experiences and lessons learnt.

Benchmarking tools

The choice between upgrading a country's existing EMIS to cover information loopholes and establishing a new system to manage education data is crucial. It also influences cost-

efficiency of EMIS maintenance, so a country could benefit considerably by opting for a correct direction.

To facilitate the decision-making process, governments or any other educational stakeholders apply certain benchmarking tools to systematically examine and strengthen the performance of their education systems so that all children and youth can be equipped with knowledge and skills for life. Based on defined dimensions of data quality, such a tool can assess an approach that a country implements to manage its educational data.

Developed by the IMF, a general Data Quality Assessment Framework (DQAF) is one of the widely-used benchmarking tools. It is applicable to statistics in a number of different subject matters, yet the World Bank in collaboration with the UNESCO Institute for Statistics (UIS) has undertaken the application of the framework to education statistics.

Ed-DQAF Dimensions		
Enabling Environment	Production	Dissemination and Use
0 Pre-requisites of quality	2 Methodological soundness	4 Serviceability
1 Integrity	3 Accuracy and reliability	5 Accessibility

The Ed-DQAF matrix of 140 quality items structured under six dimensions was applied to a series of country assessment exercises in Sub-Saharan Africa, Asia and Latin America and the Caribbean to support UIS capacity building activities in those regions.

To reach a wider number of counties, there is a **Wiki page** developed to particularly centralize all existing documentation and give access to all Ed-DQAF reports and other related materials. There is a simplified version for Ed-DQAF called Rapid Data Quality Assessment. It is applicable to self-assessments. The example is **an online tool prototype for Pacific Island Countries** shaped as a web form.

Additionally, several other benchmarking tools were developed by other international organizations: the Systems Approach for Better Education Results (**SABER**) by the World Bank and an EMIS diagnostic tool by The Association for the Development of Education in Africa (**ADEA**).

As soon as there is a profound understanding of what a current EMIS can and cannot do, a country may plan its further development and upgrade to a system that can collect, analyze and disseminate required types of data.

ICT integration into pedagogical practice

The number of qualified teaching staff in schools, gross enrollment ratio, out-of-school rate – this data can be retrieved from EMIS to support decision-making. And by referring to SDGs, a country can now introduce additional indicators to monitor the progress towards quality education.

As digital citizenship – competent engagement and responsible participation in society online – becomes an increasingly vital element in this century, EMIS require preset standards to monitor and promote innovations in education, so that it could level off with other sectors.

For education systems, decision-making based on the result of empirical analysis rather than belief or intuition is indisputable and critical, especially in the case of countries that are less developed and where the cost of applying tentative solutions is hardly acceptable. Hence, seeking to identify ways to improve education, it is crucial to obtain accurate data on the application of ICT in educational process.

Along with such traditional metrics on available infrastructure as student-to-computer ratio or even the ratio of student-to-computer-that-has-an-Internet-connection, a correct interpretation of the process of ICT integration into teaching practice requires non-trivial indicators. For example, teachers' understanding of the role of technology in pedagogical practice and their expectations can facilitate the analysis and decoding of the terms in which they calculate cost-efficiency to justify ICT integration in their work.

The methods of using technology are also associated with the training that teachers have received in the application of ICT for educational purposes and particularly in specific knowledge areas. Additionally, shedding light on teachers' initial training is as important as examining the role of continuing education in acquisition of skills to use technology in their pedagogical practice. With constant initiatives to build new **credentialing** methods and systems capable to capture, recognize and validate a broad range of learning outcomes, monitoring of such data becomes a feasible objective.

The characteristics and level of these skills would provide valuable indicators to monitor the evolution of training from the development of competencies to use technological devices and basic software to more advanced teacher trainings on how to use the Internet in specific disciplines.

EMIS and UNESCO ICT CFT

More sophisticated monitoring of ICT integration into pedagogical practices will facilitate capacity building to transform education and ensure the equity and quality of learning. By benchmarking the current situation against the UNESCO ICT Competency Framework for Teachers (ICT CFT), a country receives a tool to guide pre- and in-service teacher training on the use of ICTs across the education system and can respond to recent technological and pedagogical developments in the field of ICT and education.

Introduction of Open Educational Resources, mobile learning, the Internet of Things and Artificial Intelligence for educational purposes creates new opportunities for researchers and innovators to more easily manage data. Thus, empowering teacher taskforce with the right skills to harness technological advances will support the creation of inclusive Knowledge Societies.

Real-time data on a population' readiness to succeed in the constantly changing environment influence awareness raising, timely policy formulation, and capacity building. The result of this influence will be reflected in their contribution to building peace, sustainable economic development, and intercultural dialogue.