

SABER-ICT Framework Paper for Policy Analysis:

Documenting national educational technology policies around the world and their evolution over time

*World Bank Education, Technology & Innovation:
SABER-ICT Technical Paper Series (#01)*

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2016**



To cite this publication:

Trucano, M. 2016. *SABER-ICT Framework Paper for Policy Analysis: Documenting national educational technology policies around the world and their evolution over time*. World Bank Education, Technology & Innovation: SABER-ICT Technical Paper Series (#01). Washington, DC: The World Bank.

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Table of Contents

PART A: The SABER-ICT policy framework

1. The SABER-ICT policy framework: Goals and objectives	1
2. The SABER-ICT policy framework: Unpacking the framework	3
Policy 'stages'	6
3. The SABER-ICT policy framework	8
4. The SABER-ICT policy framework: Use cases	17
5. The SABER-ICT policy framework: Caveats, notes and limitations	20

PART B: SABER-ICT background and context

6. About SABER-ICT	22
7. About ICT use in education	23
8. About ICT in education policies & related policymaking processes	27
Lessons from the drafting of national educational technology policies	30
Annex A: About SABER	33
Annex B: ICT in education data	34
Annex C: How the SABER-ICT policy framework was constructed	37
Annex D: Common ICT/education policy frameworks: Notes on terminology differences	39
Annex E: Notable national ICT/education policies	40
Annex F: The SABER-ICT policy framework in brief.....	42
Bibliography.....	43



Acknowledgements

The *World Bank Education, Technology & Innovation: SABER-ICT Technical Paper Series* explores a variety of topics and issues related to the use of information and communication technologies (ICTs) in the education sector.

The Systems Approach for Better Education Results (SABER) initiative seeks to improve the global knowledge base related to education systems analyses, assessments, diagnoses, and opportunities for dialogue. SABER-ICT aims to improve the availability of policy-related data, information, and knowledge on what matters most in using ICTs to improve the quality of education.

This publication series is made possible through generous support from the Government of Korea, most notably through the Korea - World Bank Partnership Facility.



Many people provided key inputs for this paper, and for work under the SABER-ICT initiative in general. Carla Jimenez and Galina Voytsekhovska managed the collection of ICT in education policy documents and the development of the ICT in education policy database, aided by Konstantin Nikolayev and James Liu, and helped support the development of the SABER-ICT policy framework. Special thanks are due to a long list of people – too numerous to list by name here – who played important roles in tracking down, collecting, translating and analyzing the component parts of specific national educational technology policy documents.

This work benefited greatly from inputs and critical comments received from policymakers and partner organizations that participated in the Global Symposium in ICT Use in Education in Seoul, an annual event supported by the World Bank and the Government of Korea and hosted by the Korean Education Research & Information Service (KERIS), in partnership with UNESCO-Bangkok, from 2011-2015.

This work under SABER-ICT was conducted under the general management and leadership of Elizabeth King, Robin Horn, Harry Patrinos and Luis Benveniste. Halsey Rogers played a key role in the articulation of the overall SABER framework and concept. Helpful formal and informal peer review comments, feedback and support were received from Robert Hawkins, Arturo-Muente Kunigami, Marguerite Clarke, Juan Manuel Moreno, Sungmin Park, Hyangwook Na, Halsey Rogers, Kirill Vasiliev, Saori Imaizumi, Angela Demas, Husein Abdul-Hamid, Lorelei Lacdao, Mado Ndaw, Jongwon Seo, Min Kim and Jonghwi Park.

This work has also been informed greatly through the author's participation in the Working Group on ICT use in Education (WISE) and the subsequent technical advisory panel to work led by the UNESCO Institute for Statistics (UIS) to design survey instruments to collect policy-relevant, internally-relevant data on ICT use in education, efforts led and overseen at UIS by a group including Claude Akpabie, Peter Wallet, Beatriz Valdez-Melgar and Martin Schaaper. In many ways, this work was an extension of activities related to the utilization of the *ICT in Education Toolkit for Policymakers, Planners and Practitioners* (principal author: Wadi Haddad) by UNESCO-Bangkok, the World Bank's infoDev program, and other partners.



Executive summary

The World Bank's SABER-ICT initiative supports activities to help policymakers make informed decisions about how best to use information and communication technologies to meet educational objectives by improving the availability of policy-related data, information, and knowledge on what matters most in using ICTs to improve the quality of education.

A related SABER-ICT policy framework has been developed to assist policymakers as they attempt to analyze and benchmark their own policies on ICT use in education against international norms and those of comparator countries around the world, identifying key themes and characteristics.

While the potential and promise of ICT use in education is clear in many regards, so too are 'perils' related to the disruption of existing traditional teaching and learning practices, high costs, increased burdens on teachers, equity and issues around data privacy and security.

Policies related to technology use in change and evolve over time, often along a somewhat predictable path, and technological innovations often outpace the ability of policymakers to innovate on related policy issues. Such policies take different forms and are formulated and proposed by different institutions in different countries. No matter the country, a lack of rigorous, relevant evidence typically complicates attempts to draft impactful ICT/education policies.

Eight policy themes are commonly identified in educational technology policies around the world. These relate to (1) vision and planning; (2) ICT infrastructure; (3) teachers; (4) skills and competencies; (5) learning resources; (6) EMIS; (7) monitoring and evaluation; and (8) equity, inclusion, and safety. Four stages of policy development can be identified related to each of these themes.

It is important to note that this framework only considers policy intent – not the extent to which policies are implemented in practice, nor what the impact of such policies may be, and that rapid developments and innovations in the technology sector challenge the abilities of policymakers to offer useful related policy guidance that is forward-looking.

Policymakers may find the SABER-ICT policy framework useful as a means by which to help benchmark the current state of related policy development in their country; anticipate potential future policy directions; and draw inspiration from other countries.



1. The SABER-ICT policy framework: Goals and objectives

The SABER-ICT policy framework is designed to help policymakers make better informed decisions about how best to use information and communication technologies (ICTs) in pursuit of core developmental objectives in the education sector. It aims to aid and inspire education policymakers as they draft, re-consider, and evaluate key policies related to the use of information and communication technologies, especially within the formal education sector at the primary and secondary (K-12) level. More specifically, the framework can assist policymakers as they attempt to analyze and benchmark their own policies on ICT use in education against international norms and those of comparator countries around the world.

The framework was constructed by analyzing and synthesizing policy documents from over 80 countries.¹ The vast majority of these policies relate to formal schooling at the primary and secondary level; related official policy guidance for other parts of an education system, including at the level of early childhood development, technical and vocational education (TVET) and higher education, as well as pertain to out-of-school and life-long learning, is comparatively rare. As such the greatest utility of this framework will most likely be found when it is used to analyze policy environments in K-12 schooling. While the SABER-ICT framework was constructed through an analysis of national ICT/education policies, it is expected that it may be useful when attempting to analyze and benchmark related sub-regional policies (i.e. at the provincial or state level) as well.

What policymakers think ‘matters’ when it comes to ICT use in education, based on their related policy guidance

By surfacing and helping to give structure to a body of current and past policies related to ICT use in education around the world, the SABER-ICT policy framework seeks to help policymakers as they seek to discover answers to two separate but related high level questions:

- What are the key components (“themes”) of policies meant to guide and direct efforts related to the use of information and communication technologies in the education sector?
- For each theme or component, what are the common characteristics that comprise these policies, and how do they typically change over time?

Lack of rigorous, relevant evidence complicates attempts to draft impactful ICT/education policies – and to evaluate the impact of existing policies

It can often be difficult to present evidence-based policy advice related to ICT use in education to inform large-scale investments in educational technologies across an education system based on hard, rigorously collected data for the simple reason that there are not a lot of rigorously collected, globally comparable data available², nor a large body of evidence related to the ‘impact’ of technology use in education.³

¹ For more information, see Annex C: How the SABER-ICT policy framework was constructed.

² See Annex B, ICT in education data, for more information.

³ For general reviews of the literature around the ‘impact’ of technology use in education see *The IDB and technology in education: how to promote effective programs?* (IDB, 2014), *Educational Technology Topic Guide* (Dfid, 2014), and *Decoding Learning: The proof, promise and potential of digital learning* (NESTA, 2012). This is also the topic of a companion paper in the SABER-ICT series, *What Matters in Technology Use in Education: Literature Review and Knowledge Maps* (World Bank, forthcoming).

The SABER-ICT policy framework is largely descriptive, not evaluative.

This is not to contend that policymaking on topics related to the use of ICTs in education takes place in an environment that is entirely evidence-free. Especially in the past decade, understanding of what works, and what doesn't -- often earned as a result of learning hard-won lessons from educational technology efforts that did not meet optimistic targets initially announced (often with much fanfare) -- has grown immensely.

Rather, it is meant as a reminder that,

- much of what is 'known' is based on anecdotal evidence; on theories (hypotheses might actually be the more accurate term) that are not supported by a rich evidence base demonstrating cause-and-effect (or sometimes, even loose correlation); and/or on research activities with very small sample sets, which rely on self-reported measures of impact or which are underwritten by vendors (who have a stake in the reported outcomes); and that
- much of what is collectively 'known' is derived from experiences from highly developed (OECD) countries that may or may not be relevant to middle and low income countries.

Policy vs. practice vs. impact

Whether or not the rhetorical interest or attention by policymakers to certain key identified common themes translates into actual practices in schools, or by teachers and learners, is of course another matter. And: Even if/where it does, what appears to matter most to policymakers -- at least based on what is identified in related policy documents -- may not in fact be what's most important. It may well be the case that policymakers are missing some things -- some rather important things! -- or that their attention is directed towards areas that, in the end, are not terribly consequential in their impact on student learning, or on the health and performance of an education system overall.

Pointing out potential gaps between rhetoric and reality (or utility) can help inform the development of future policies related to technology use in education that are more relevant and impactful. Providing a means by which policymakers can analyze and benchmark their policies against those of their counterparts in other countries, using a tool like the SABER-ICT policy framework, can hopefully help as well.

2. The SABER-ICT policy framework: Unpacking the framework

The SABER-ICT policy framework is presented as a rubric. Eight policy 'themes' (subdivided into 20 additional areas of common policy guidance) are identified. Four typical 'stages' of policy direction or development are presented related to each policy theme. An additional set of 'cross-cutting' themes of niche or emerging interest are also described. The division of the framework in this way into individual themes, component characteristics and stages is meant to help policymakers in as part of a process of analysis, discovery and inspiration; in actual practice, such divisions may overlap in significant ways or not be very clear cut.

Key themes in educational technology policies

The SABER-ICT policy framework identifies eight key themes common to such policies, as well as a set of 20 key areas of policy guidance (or 'characteristics') related to these themes:

1. Vision and planning

▪ *Vision* ▪ *Policy linkages* ▪ *Funding* ▪ *Implementation authority* ▪ *Private sector engagement*

2. ICT Infrastructure

▪ *Power* ▪ *Infrastructure*

3. Teachers

▪ *Training* ▪ *Standards* ▪ *Support* ▪ *Administrators*

4. Skills and competencies

▪ *Digital competency* ▪ *Lifelong learning*

5. Learning resources

▪ *Digital learning resources*

6. EMIS (education management information systems)

▪ *EMIS*

7. Monitoring and evaluation, assessment, research, and innovation

▪ *M&E* ▪ *assessment/testing* ▪ *R&D*

8. Equity, inclusion, and safety

▪ *Equity* ▪ *Digital ethics & safety*

In addition, a set of less common but nevertheless notable 'cross-cutting' themes around specific topics have been identified which are of emerging policy interest in a number of countries. Many of these themes address 'frontier' topics (e.g. the use of mobile devices, open education resources, data privacy) likely to be of relevance to policymakers in a larger set of countries going forward, but where related policymaking typically lags behind practice.

A basic discussion of the eight key component themes identified in this framework, as well as the key characteristics of related policy guidance, follows below:

Theme #1: Vision and planning

• *Having a vision*: It may seem obvious, if not axiomatic, that articulating and disseminating a vision to help guide efforts to introduce and utilize ICTs to support teaching and learning is important. That said, in 2016, not every country has done so -- and many countries have only

articulated visions limited in scope to certain specific topics (giving every student a laptop or tablet, for example, or connecting all schools to the Internet).⁴

- *Linking ICT/education policies to other policies (including those 'outside the sector')*: As education policymakers gain more experience, stronger and more explicit linkages between ICT/education policies promulgated by different governmental agencies and ministries, as well as broader policies related to education, technology use and economic development, typically come into place.
- *Providing a mechanism for funding*: When ICTs are first introduced within education systems, regular, reliable mechanisms to fund and support technology use over time are not typically considered. As costs are better understood, and as access to ICTs gains in strategic importance over time, financing related to ICTs beyond support for infrastructure usually becomes a more regular part of the budgeting process.
- *Authorizing authority to lead or oversee implementation*: Over time, specialized agencies and organizations, with specialized competencies and responsibilities related to ICT use in education related to ICT use to support teaching and learning typically emerge.
- *Engaging the private sector*: For a variety of reasons -- including those related to funding, access to industry expertise and stakeholder coordination -- public-private partnerships of various sorts often gradually assume greater prominence and importance.

Theme #2: Infrastructure

- *Ensuring adequate power*: In many developing countries, issues around reliable and affordable access to power loom increasingly large in the minds of policymakers, and ICT/education policies may become more closely aligned with policies around e.g. rural electrification.
- *Providing sufficient equipment and networking infrastructure*: When it comes to educational technologies, what's 'sufficient' is typically a moving target. As ICT use increases, there is typically more demand for access to ICT devices and for faster and more reliable connectivity. It is often only over time that the importance of technical support and maintenance becomes truly apparent, and that related funding and human resource measures are put into place.

Theme #3: Teachers

- *Providing ICT-related training (technical and pedagogical) for teachers*: Support for teachers often is often deemphasized in the early stages of ICT rollouts in education; over time, most education systems slowly invest more in related technical and pedagogical professional development for teachers.
- *Identifying a set of related teacher ICT competency standards*: Competency standards for teachers are often revised over time to reflect the new demands placed on teachers as a result of the increased use of ICTs; new related formal certification schemes may be introduced as well.
- *Supporting teachers in their use of ICT*: As follow-on to formal training programs, online and offline support mechanisms for teachers, including the networking of teachers themselves through the use of ICTs, typically increases in importance and emphasis over time.
- *Building awareness among and support for school administrators, as a support for ICT use by teachers and learners*: Awareness raising and training for school headmasters of lags that for

⁴ Reasonable people may perhaps disagree about whether having a 'bad vision' (which, because it has been explicitly articulated, offers a possibility for amendment and course correction over time as a result of 'learning by doing' and iteration)) is better than having 'no vision'.

teachers, but over time, the potentially critical role of school administrators in enabling and supporting changed practices in schools as a result of ICT use assumes greater importance.

Theme #4: Skills and competencies

- *Identifying ICT literacy / digital competency standards, and offering related training, support, assessment and certification:* One common rationale for investment in ICTs in education systems is to promote the development of 'ICT literacy'. In the early stages, this usually means an aptitude with basic software applications; later, it is about developing higher order skills associated with more complex 'digital literacies' (especially related to how ICTs can be used to support student learning).
- *Articulating and supporting ICT-enabled lifelong learning opportunities:* As ICT use becomes more widespread across an education system, and as more people develop basic related skills and competencies, interest in the utilization of ICTs for learning activities outside of and beyond formal schooling typically increases.

Theme #5: Learning resources

- *Supporting the development, dissemination and utilization of digital learning resources:* In the early stages of ICT deployments in schools, investment in devices is often prioritized over investments in the content that will be made available through the use of such devices. Over time, this changes, and issues related to the mapping of digital content to specific curricular objectives, intellectual property, and the creation of digital teaching and learning materials by students and teachers themselves, gain greater prominence.

Theme #6: Education Management Information Systems (EMIS)

- *Supporting the collection, processing, analysis, and dissemination of education-related data to relevant stakeholders:* Policies around education management information systems are sometimes included as part of broader ICT/education policies. Where they are, initial policies are often rather minimal, and focus on the collection of basic enrolment data by a central body. Over time, as ICT use becomes more prevalent across an education system, more systematic and holistic views of data collection, processing, analysis and dissemination emerge.

[*Note:* There is a separate SABER 'domain' that considers issues and topics related to education management systems in detail: SABER-EMIS.⁵]

Theme #7: Monitoring and evaluation, assessment, research and innovation

- *Monitoring ICT use in education and evaluating its impact on teaching and learning:* As countries invest more in ICTs, and as these investments become more strategic, a greater emphasis on monitoring and evaluation typically occurs, evolving from a simple counting of basic inputs (e.g. how many computers are in schools) to more sophisticated attempts to assess impact on learning.
- *Utilizing ICTs to support assessment activities:* As ICT use become more widespread, interest in ICT-enabled assessments (e.g. taking tests on computers) becomes more common.
- *Dedicated support for exploring innovative uses of ICTs in education:* Initial efforts to introduce ICTs and ICT-related initiatives in schools often begin as small pilots. Over time, such 'piloting'

⁵ For more information, see the related SABER-EMIS web site (<http://saber.worldbank.org/index.cfm?indx=8&tb=2>) or 'framework paper' (World Bank, 2014. *What Matters Most for Education Management Information Systems: A Framework Paper. SABER Working Paper Series No. 7. Washington, DC: The World Bank.*)

can wane as policymakers focus more on scale, but after large scale rollouts are completed, more dedicated interest in exploring new 'innovations' re-emerge.

Theme #8: Equity, inclusion and safety

- *Prioritizing “pro-equity” provisions and approaches related to the use of ICTs in education:* While rhetoric related to closing 'digital divides' may characterize initial ICT/education policies, little attention is typically given to specific 'pro-equity' approaches targeting specific marginalized groups. As the nature of varied impacts on different groups are recognized, and as the easiest to connect groups are connected, policymakers place greater emphasis on equity-related issues.

- *Articulating and supporting efforts to promote ethical practices related to ICT use in education, including the safety and security of data and appropriate privacy provisions:* Child digital safety issues and the promotion of practices meant to create greater awareness around 'digital ethics' typically only emerge in the later stages of policymaking related to ICT/education efforts.⁶

Cross-cutting themes

In addition, to these eight general themes, the SABER-ICT policy framework also attempts to document a number of specialized or niche 'cross-cutting' themes. Some of these are of current relevance to a sub-set of countries (e.g. *distance education, open educational resources*). Other are noted because of their specific potential relevance to a separate SABER domain (e.g. *early childhood development*). Yet others are only evident in the policies of a smaller number of countries commonly considered to be at the leading edge of policymaking related to ICT use in education, and therefore may point to emerging or 'frontier' policy themes which may be relevant to a wider number of countries going forward (e.g. the use of *mobile devices, community involvement, data privacy*).

Policy 'stages'

For each theme, the SABER-ICT policy framework presents four developmental 'stages', consistent with the terminology utilized in all domains considered within the World Bank's SABER initiative: latent; emerging; established and advanced. These levels are artificially constructed categories which represent key elements along an underlying continuum.

The 'first' and 'fourth' stages are the easiest to understand and delineate:

- *latent* (stage #1) characterizes what is often the initial policy response; often times this denotes the absence, or a bare minimum, of related policy guidance; and
- *advanced* (stage #4) represents what is widely considered to be 'best practice'.

The differences between the two 'middle' stages are largely ones of degree:

- *emerging* (stage #2) denotes specific policy attention to the theme; while
- *established* (stage #3) then can be seen as an extension, enlarging or deepening of this attention

It is noted and acknowledged that there is room for interpretation here, and the assignment of the consideration of a particular issue within a given country's policy environment to correspond to one of these four 'stages' can appear rather artificial and subjective. This artificial division into stages is not meant to imply that a given country's treatment of a particular theme is 'better' or

⁶ With very few exceptions around the world, student privacy issues are rarely considered or addressed in ICT/education policies.

more 'appropriate' than the treatment found in the policies of another country. Rather, it is meant to help policymakers determine where along a common continuum of policy development their own policies might most accurately be placed. It is hoped that this general four stage classification has some general utility in helping policymakers identify how their current policy environment (and its key constituent parts) compares to that which characterizes similar policies in other countries.

It is also important to note that the terms used under SABER-ICT to designate these four stages of policy development are slightly different than those often used to describe a four-stage framework for policy analysis related to ICT/education which has been in widespread use by many other development institutions. (For a related explanation and discussion, please see *Annex D, Common ICT/education policy frameworks: Notes on terminology differences.*)



1. Vision and Planning (related SABER domain: Engaging the Private Sector, 1.5)					
	<i>stage:</i>	<i>Latent</i> ●○○○	<i>Emerging</i> ●●○○	<i>Established</i> ●●●○	<i>Advanced</i> ●●●●
1.1	<i>Vision and overall goals</i>	<ul style="list-style-type: none"> •No policies on ICT in education •Introduce ICT into select educational processes and activities 	<ul style="list-style-type: none"> •Draft policy on ICT in education •Integrate ICT into select educational processes and activities 	<ul style="list-style-type: none"> •The policy on ICT in education has been approved/draft serving as a de facto policy •Integrate ICT in education at all education levels 	<ul style="list-style-type: none"> •Explicit policy guidance related to ICT/education topics; ICT in education policy is fully operationalised and seeks to transform learning environments, teaching practices and administrative processes with the aid of ICTs
1.2	<i>Linkages between ICT in education policy and other sectoral policies</i>	<ul style="list-style-type: none"> •No linkages to ICT/education issues in other policies 	<ul style="list-style-type: none"> •No/few linkages to ICT/education issues in other policies 	<ul style="list-style-type: none"> •Many linkages between ICT policy and other education policies 	<ul style="list-style-type: none"> •Strong, explicit linkages between ICT policy and other sectoral policies
1.3	<i>Public funding and expenditure for ICT in education</i>	<ul style="list-style-type: none"> •No or minimal regular public expenditure for ICT in education 	<ul style="list-style-type: none"> •Occasional, non-regular public expenditure on ICT in education, 	<ul style="list-style-type: none"> •Regular public expenditure on ICT in education, on infrastructure and some non-infrastructure items 	<ul style="list-style-type: none"> •Regular public expenditure on ICT in education on infrastructure and many non-infrastructure items
1.4	<i>Institutional arrangements</i>	<ul style="list-style-type: none"> •No dedicated unit/agency for ICT in education 	<ul style="list-style-type: none"> •Only a small number of people with related dedicated responsibility, plan to set up a unit/ agency on ICT in education 	<ul style="list-style-type: none"> •Dedicated, professionally staffed unit/ agency for ICT in education 	<ul style="list-style-type: none"> •Dedicated, professionally staffed focal unit/agency charged with implementing policies on ICT in education actively coordinating with other organizations
1.5	<i>Public Private Partnerships (PPP) on ICT in education</i>	<ul style="list-style-type: none"> •No PPPs enabling or supporting ICT/education initiatives 	<ul style="list-style-type: none"> •Some PPPs enabling or supporting ICT/education initiatives 	<ul style="list-style-type: none"> •Commitment to coordinating PPP initiatives related to ICT/education 	<ul style="list-style-type: none"> •Explicit commitment to integrating, coordinating and monitoring PPP initiatives related to ICT/education



2. ICT Infrastructure (related SABER domain: none)					
	stage:	Latent ●○○○	Emerging ●●○○	Established ●●●○	Advanced ●●●●
2.1	<i>Electricity supply</i>	<ul style="list-style-type: none"> •School electrification is an acute issue across the system 	<ul style="list-style-type: none"> •School electrification is an issue only in rural areas 	<ul style="list-style-type: none"> •School electrification is an issue only at the margins 	<ul style="list-style-type: none"> •School electrification is not an issue
2.2	<i>ICT equipment & related networking infrastructure</i>	<ul style="list-style-type: none"> •Few schools have computers or related devices •Few schools connected to the Internet •e-Waste issues not considered 	<ul style="list-style-type: none"> •Most schools have computers and/or other related devices (usually in dedicated computer labs) •Most schools connected to the Internet (slow connections) •Some use of digital projection equipment •e-Waste issues considered 	<ul style="list-style-type: none"> •All schools have reliable broadband Internet access and computing facilities •Some computers in classrooms •Widespread use of digital projection equipment •Some teachers provided with computers or related devices •Computing facilities being introduced at scale in libraries, science labs and/or other venues inside schools •Some e-Waste policies in place 	<ul style="list-style-type: none"> •Access to computing resources available in multiple places in schools: labs, classrooms, libraries, mobile •Robust broadband wireless and wired networks available for student and faculty use, support for BYOT •All teachers have on-demand access to the Internet •Access to computers and the Internet outside school provided to certain student populations •Comprehensive e-Waste policies in place
2.3	<i>Technical support & maintenance</i>	<ul style="list-style-type: none"> •No reliable mechanism for systematic maintenance for ICT infrastructure •Maintenance costs are not budgeted 	<ul style="list-style-type: none"> •Technical support mechanisms are insufficient / ad hoc •Maintenance costs are not budgeted regularly 	<ul style="list-style-type: none"> •Generally sufficient, systematic technical support mechanisms in place •Maintenance costs are budgeted regularly 	<ul style="list-style-type: none"> •Robust technical support mechanisms in place and equipment maintenance is not an acute issue •Maintenance costs are sufficient and budgeted regularly



3. Teachers (related SABER domain: Teachers)					
	stage:	Latent ●○○○	Emerging ●●○○	Established ●●●○	Advanced ●●●●
3.1	<i>Teacher training and professional development (including pre-service and in-service) on ICT – related topics</i>	<ul style="list-style-type: none"> •Teachers do not receive ICT-related training 	<ul style="list-style-type: none"> •Teachers receive one-time technical training on basic computer skills 	<ul style="list-style-type: none"> •Teachers receive training on the pedagogical use of ICTS, and have access to related ongoing technical and pedagogical support , at both the pre-service and in- service levels 	<ul style="list-style-type: none"> •ICT use and related pedagogical training and support is integral to regular, on-going programs aimed at providing targeted pre- service and ongoing professional development opportunities for teachers
3.2	<i>ICT-related teacher competency standards</i>	<ul style="list-style-type: none"> •No ICT-related teacher competency standards 	<ul style="list-style-type: none"> •A basic level of ICT - related competency standards for teachers have been defined 	<ul style="list-style-type: none"> •ICT-related competency standards have been introduced, are in widespread use, and are linked to some certification scheme(s) 	<ul style="list-style-type: none"> •ICT-related competency standards for teachers and related certifications are in place, and integrated into general competency standards for teachers
3.3	<i>Teacher networks/ resource centers for teachers</i>	<ul style="list-style-type: none"> •No online teacher support network •No ICT-related resource centers for teachers 	<ul style="list-style-type: none"> •Some online teacher support mechanisms in place •ICT-related resource centers for teachers are being set up 	<ul style="list-style-type: none"> •Online teacher support network in use • ICT-related resource centers for teachers provide support and advice 	<ul style="list-style-type: none"> •Online-and/or mobile teacher support network in widespread use •ICT-related resource centers are funded and play important positive roles in supporting teachers
3.4	<i>School leadership training, professional development and competency standards</i>	<ul style="list-style-type: none"> •School leaders receive no ICT-related training 	<ul style="list-style-type: none"> •School leaders receive awareness-raising training on ICT-related topics 	<ul style="list-style-type: none"> •School leaders receive ICT-related training, ICT-related competency standards for school leaders are articulated 	<ul style="list-style-type: none"> •ICT-related training for school leaders is readily available and related competency standards are in place



4. Skills and competencies (related SABER domain: Workforce Development)					
	<i>stage:</i>	<i>Latent</i> ●○○○	<i>Emerging</i> ●●○○	<i>Established</i> ●●●○	<i>Advanced</i> ●●●●
4.1	<i>ICT literacy/digital competency</i>	•No ICT literacy/digital competency efforts	•Some, mostly low level, ICT literacy/digital competency efforts	•Wide-spread ICT literacy/digital competency efforts •Certification	•Digital competency is viewed as an essential 21 st century skills •ICT-related competency frameworks defined beyond just technical skills
4.2	<i>Non-formal education/lifelong learning/vocational education</i>	•No ICT-enabled non-formal education/ lifelong learning is provided	•Some ICT-enabled non-formal education/ lifelong learning is provided	•ICT-enabled non-formal education/ lifelong learning is wide-spread	•There is an robust integrated vision for lifelong learning enabled by ICT



5. Learning resources (related SABER domain: none)					
	stage:	Latent ●○○○	Emerging ●●○○	Established ●●●○	Advanced ●●●●
5.1	Digital content/digital learning resources (DLR) and curriculum	<ul style="list-style-type: none"> •No digital content/no DLR are used in teaching 	<ul style="list-style-type: none"> •Some digital content/ DLR are available •Digital content is available in some classrooms 	<ul style="list-style-type: none"> •DLR are widely available, some explicit linkages to curricular objectives •On-line education portal is available •Digital content is available in most classrooms •Some attention is paid to intellectual property issues (e.g. around OER issues) •Some access to DLR outside of school 	<ul style="list-style-type: none"> •Teachers and students access digital content/DLR resources linked to specific curricular and learning objectives, anytime anywhere, using a range of devices and platforms •Teachers and students regularly use, develop- re-use and re-mix develop digital teaching and learning resources •‘Advanced’ digital learning resources (e.g. robotics, simulations, games) are used in teaching •Intellectual property issues are well considered •Users involved in evaluating and assessing quality of digital learning resources



6. Education management information systems (EMIS) (related SABER domain: EMIS)

	<i>stage:</i>	<i>Latent</i> ●○○○	<i>Emerging</i> ●●○○	<i>Established</i> ●●●○	<i>Advanced</i> ●●●●
6.1	<i>ICT use in management of the education system (EMIS)</i>	<ul style="list-style-type: none"> •Little/no mention of EMIS 	<ul style="list-style-type: none"> •EMIS use coordinated centrally by ministry, minimal exchange of data with individual schools 	<ul style="list-style-type: none"> •EMIS in widespread use for a limited number of data points, primarily to feed central education system database 	<ul style="list-style-type: none"> •National EMIS uses ICT to collect, process and store information produced by various levels of the education system and to disseminate data to various level of the education systems as a key decision tool, accessible via multiple channels (e.g. Internet, mobile devices), with some access to EMIS data available to the general public and with robust security and data privacy safeguards in place



7. Monitoring and evaluation, assessment, research and innovation (SABER domain: Student Assessment)					
	stage:	Latent ●○○○	Emerging ●●○○	Established ●●●○	Advanced ●●●●
7.1	<i>Monitoring ICT use and evaluating its impact</i>	<ul style="list-style-type: none"> •Little monitoring; what monitoring exists is irregular, incomplete and relates primarily to access to infrastructure •Impact of ICT use is not measured 	<ul style="list-style-type: none"> •Most monitoring is of inputs •Impact of ICT is measured irregularly; most impact measurements related to changes in attitudes and perceptions of changes in activity 	<ul style="list-style-type: none"> •Regular monitoring of system inputs •Impact of ICT is measured regularly; some measures relate to learning outcomes •Some regular or systematic independent M&E of ICT/education activities carried out 	<ul style="list-style-type: none"> •Robust M&E system is in place to measure the use of ICT across a variety of areas and related impacts, including learning outcomes •Policy choices and decisions related to ICT informed by rich evidence base •M&E function or activities related to ICT/education largely independent of project implementers
7.2	<i>ICT use in assessment</i>	<ul style="list-style-type: none"> •ICT is not used in assessments 	<ul style="list-style-type: none"> •ICT is utilized by students and teachers in formative assessment activities to a minor extent 	<ul style="list-style-type: none"> •ICT is used in formative assessments in most schools to some extent •ICT used in some national or regional summative assessment activities 	<ul style="list-style-type: none"> •ICT-based assessments widely used, at the formative and summative levels, including as part of national or school leaving examinations
7.3	<i>Innovation, research and development</i>	<ul style="list-style-type: none"> •There is no/minimal R&D activities innovative pilots related to ICT/education 	<ul style="list-style-type: none"> •Irregular / ad hoc activities related to R&D or innovative pilots , little impact on planning 	<ul style="list-style-type: none"> •Regular programs of R&D and innovative pilot activities , some impact on planning 	<ul style="list-style-type: none"> •Special budget or fund for R&D activities •Centers of excellence for R&D of ICT use and services •R&D and innovation central to planning – it is part of the system



8. Equity, inclusion and safety (SABER domains: Equity and Inclusion; Resilience)

	<i>stage:</i>	<i>Latent</i> ●○○○	<i>Emerging</i> ●●○○	<i>Established</i> ●●●○	<i>Advanced</i> ●●●●
8.1	<i>“Pro-equity” provisions and approaches</i>	<ul style="list-style-type: none"> •“Pro-equity” provisions and approaches related to ICT/education listed below are not covered: <ul style="list-style-type: none"> - <i>gender</i>; - <i>rural/urban divides</i>; - <i>low-income communities</i>; - <i>special needs students</i>; - <i>minority, cultural, religious, linguistic and/or indigenous groups</i>; - <i>gifted students</i>; - <i>older learners</i> 	<ul style="list-style-type: none"> •Some of the following provisions and approaches related to ICT use in education are covered: <ul style="list-style-type: none"> - <i>gender equality</i>; - <i>rural/urban divides</i>; - <i>low-income communities</i>; - <i>special needs students</i>; - <i>indigenous groups</i>; - <i>gifted students</i> - <i>older learners</i> 	<ul style="list-style-type: none"> •Most of the following “pro-equity” provisions or approaches related to ICT use in education are addressed: <ul style="list-style-type: none"> - <i>gender equality</i>; - <i>rural/urban divides</i>; - <i>low-income communities</i>; - <i>special needs students</i>; - <i>indigenous groups</i>; - <i>gifted students</i> - <i>older learners</i> 	<ul style="list-style-type: none"> •All “pro-equity” provisions or approaches related to ICT use in education are addressed: <ul style="list-style-type: none"> - <i>gender equality</i>; - <i>rural/urban divides</i>; - <i>low-income communities</i>; - <i>special needs students</i>; - <i>indigenous groups</i>; - <i>gifted students</i> •Specialized software is available for special groups at all education institutions at all levels •There are teachers qualified to provide ICT-assisted instruction to special needs students
8.2	<i>Digital ethics, safety and citizenship</i>	<ul style="list-style-type: none"> •No policies or legislation on child digital safety issues, education system does not play a role in educating children about related risks 	<ul style="list-style-type: none"> •Legislation covers some aspects of child digital safety, largely focusing on law enforcement issues and filtering 	<ul style="list-style-type: none"> •Legislation covers most aspects of child digital safety, digital ethics and citizenship issues are emerging areas of attention 	<ul style="list-style-type: none"> •Legislation covers all aspects of digital safety, issues are digital ethics and citizenship are integrated into considerations of ICT use



Cross-cutting themes (SABER domains: ECD, x.3; Tertiary Education, x.4)					
	stage:	Latent ●○○○	Emerging ●●○○	Established ●●●○	Advanced ●●●●
x.1	<i>Distance education / distance learning</i>	• No/minimal distance education/ training opportunities enabled by ICT	• Some distance education/ training opportunities enabled by ICT	• Many distance education/ training / learning opportunities enabled by ICT provided, partially integrated or 'blended' with more traditional educational delivery practices	• Access to distance education / training / learning opportunities enabled by ICT widespread, closely integrated or 'blended' with all other traditional methods of educational service delivery
x.2	<i>Mobiles</i>	• Not considered – possibly deterred	Some attention to mobiles (perhaps only one kind, e.g. only laptops)	• Specific emphasis or attention to use of some types of mobile devices and emerging levels of scale	• Potential for specific advantages or affordances of mobile technologies to be realized, as one tool among many technology choices, including phones, laptops, e-readers, tablets, and a variety of handheld devices
x.3	<i>ECD</i>	• No policies	• ICT use at ECD level mentioned	• ICT use at ECD level considered	• Coherent policies for ICT use in support of ECD activities
x.4	<i>OER</i>	• No policies	• OER mentioned	• OER considered as part of policy	• Clear IP framework (including user generated) • OER repository • Clear targeted directives
x.5	<i>Community involvement</i>	• Not considered	• Some mention of community involvement	• Targeted involvement with specific community members	Engagement with various community stakeholder groups considered integral
x.6	<i>Data privacy</i>	• Not considered	• Data privacy mentioned	• Emerging attention to data privacy issues	• Clear policies related to data privacy, including data management, ownership of data, and safeguards

ECD = Early Childhood Development | OER = Open Educational Resources



4. The SABER-ICT policy framework: Use cases

The SABER-ICT policy framework is intended as a tool for analysis, inspiration, discovery and analysis, not as a tool for judgment. As such, it is meant to provide policymakers not only with a common framework with which to benchmark the current state of their own ICT/education policies, but also to suggest possible future directions in policymaking that may be worth considering and, by providing a mechanism with which to analyze policies from other countries, to suggest 'pointers' to experiences and lessons of potential relevance as well.

Over time, the treatment of key thematic components of related policies tends to change and evolve along common paths as education systems make larger investments in ICTs, learning key lessons as a result of hands-on implementation experiences along the way.

Sample use case #1: Analyzing the current state of a country's existing ICT/education policy environment

A policymaker might wish to get a general benchmark of how the policy environment in his/her country compares to common global experience and practice. At a high level, the SABER-ICT policy framework can be useful to the extent that it identifies key policy themes across countries, as well as common components and characteristics of these themes. A policymaker can analyze his/her country's own related policy directives according to each of these themes, identifying the extent and nature of related policy guidance. At a general level, this can suggest policy themes which may require more attention. Where many policy themes and characteristic components fall into the 'latent' stage (#1), and a country is planning for large scale and strategic investments related to the use of ICTs in education (or indeed is already engaged in such a process), this may point to potentially important conflicts between the relevance of current policy guidance with current (or proposed) practice. Conversely, where many policy themes or characteristic components fall into the 'advanced' stage (#4), and a country has in fact made few investments to support technology use in education, this disconnect might trigger a consideration of whether policies on paper are appropriate, given the current state of related activity 'on-the-ground'.

That said, where policies are meant to be forward looking, this disconnect may not necessarily represent an area for concern, but rather may suggest potential next stages of activity, based on internationally-observed norms.

Sample use case #2: Projecting potential future policy directions

By benchmarking a country's current policy environment against what similar policies contain in other countries, a policymaker may gain insight into the types of policy guidance that might be relevant or needed in the future, should his/her country's policy environment evolve in a way that is consistent with the evolution in other countries. If, for example, a basic level of ICT-related competency standards for teachers have been defined (as would be typical for countries at the emerging stage of policy theme component 3.2, ICT-related teacher competency standards), a policymaker may wish to consider the extent to which such standards are already in widespread use, and whether it might be worthwhile to link them to a specific certification scheme or process.

Sample use case #3: Drawing inspiration from educational technology policies in other countries

When beginning a process of drafting a new educational technology policy, revising an educational technology policy, or evaluating a current policy, understanding similar policy environments in other countries can be rather useful. Looking abroad can help a country

benchmarks its own policies and contexts against those of other countries and potentially provide inspiration for policy guidance that local policymakers had not previously considered.

In this regard, policy environments in five different general categories of countries may be of interest:

- a. *'Leading' global examples:* For better or for worse, a consistent theme in educational technology policymaking is that countries wish to learn from, and compare themselves with, what is happening in places like the United States, Singapore and South Korea. While often rightly considered leading global examples, the relevance of educational technology policies in such places for (e.g.) a low-income country in Africa just now seriously considering its first large scale investments in educational technologies, and so contemplating the development of its first related policy, or even for a middle income country from Eastern Europe or Central Asia which has had more experience over a longer period of time, but only a very basic related policy to help guide new investments, can often be somewhat problematic.
- b. *Aspirational comparators:* While policymakers may wish to benchmark their policies in the long run with what is happening in some of the most developed countries in the world, in the shorter term it may be more prudent to consider policy environments in countries that are 'just a bit more advanced than we are'. While policies from Country X may represent global best practice, policies from Country Y, which not too long may have been in the position much like that of the country considering the development of a new ICT/education policy, may actually offer better models.
- c. *Similar comparators:* When considering policies related to ICT use in education, many policymakers are understandably interested in what countries 'like us' (essentially at the same general stage of development, with similar characteristics, etc.) are doing.
- d. *'Competitors':* No matter the similarity or difference in country income levels and contexts, policymakers may also be interested in the policy environments of countries which they consider (for whatever reason, whether politically, culturally, economically or militarily) to be their 'competitors'.
- e. *Neighboring countries:* For obvious reasons, policymakers may also be interested in what is happening in neighboring countries with regards to ICT use in education.

Here's a concrete example of how a country could analyze and benchmark its own policy environment with those of a set of comparator countries using the SABER-ICT policy framework, related a specific common characteristic or component part of a given theme:

When it comes to draft ICT/education policies related to general 'vision and planning', many countries identify specific institutional arrangements related to the oversight and implementation of ICT/education initiatives. Generally speaking, related directives address this issue in four ways (which, according to the standard SABER-ICT policy framework, are divided into four 'stages', as typically a progression is observable over time):

Latent (stage #1): No dedicated group/unit/agency for ICT in education

Emerging (stage #2): A plan to set up a unit/agency on ICT in education (or a very small group exists with this responsibility)

Established (stage #3): A dedicated, professionally staffed unit/agency for ICT in education



Advanced (stage #4): A dedicated, professionally staffed focal unit/agency charged with implementing policies on ICT in education which actively coordinates with other organizations on ICT/education issue

If a country is currently at stage #1 here, it may be useful for policymakers to examine policies and practices, *as well as lessons and experiences*, from countries that have been classified as being at stages #2 and #3, as such countries might offer useful opportunities for learning and comparison, in addition to considering 'leading global examples', and the policy environments (e.g.) in neighboring countries with which they may typically compare themselves. If policymakers are considering doing something that another place has already been trying to do (or indeed has done), there might be some relevant lessons that can be learned from related experiences in that other place.



5. The SABER-ICT policy framework: Caveats, notes and limitations

The following guidance notes are provided to aid in understanding, using and interpreting the SABER-ICT framework. They are meant to offer additional insight which may inform the understanding and use of the tool. By identifying and clarifying some of the important intentions and assumptions which animated the development of the framework, it is hoped that the chances that the framework may be used for purposes for which it is not suited or useful will be lessened.

a. The SABER-ICT policy framework only considers policy intent – not the extent to which policies are implemented in practice, nor what the impact of such policies may be

It is important to consider in what regards the framework can be useful – and where it cannot. The framework only considers policy intent. Other tools need to be used in order to assess the extent to which policies are implemented, as well as the impact of such efforts. For the most part, policymaking related to ICT use in education is not evidence based – in part due to the lack of evidence available to policymakers to inform their activities, and in part due to other factors. That said, understanding policy intent can be important for a number of reasons, especially where an understanding of a given policy environment can help reveal potential linkages between policies, implementation activities and modalities, and their related impacts and outcomes.

b. The SABER-ICT policy framework takes a holistic view of a country's entire related policy environment

In many countries, policymaking related to ICT use in education can be rather messy. Multiple government ministries and agencies may issue policy guidance in ways that are uncoordinated, and potentially even conflict with each other in certain regards, while at the same time certain themes remain unaddressed or 'fall through the cracks of the bureaucracies'. Related policy guidance may be embedded within a number of other government policies, both within the education sector (e.g. policies related to teachers or textbooks) or across sectors (e.g. policies related to the 'information society', or access to telecommunications). While the SABER-ICT policy framework is meant to provide insight for policymakers about the policy environment as a whole, it may offer little assistance in helping to determine which governing authorities should have jurisdiction or oversight over individual policy themes or elements.

c. Typically, national policies related to ICT use in education largely (and in many cases, only) consider the formal education system and focus on the use of technology in school settings at the primary and secondary levels

While the access to, and use of, ICTs are proliferating quickly across societies and communities around the world, government policies related to the use of such tools for educational purposes quite often only consider the extent to which ICTs are used within schools themselves. In other words, the focus is more about the place of ICTs within formal schools settings than with the use and relevance of ICTs to support learning more broadly, wherever it may take place. By attempting to document current policy intent, the SABER-ICT framework reflects this general bias.

d. The SABER-ICT framework is not a tool to benchmark whether a country is 'advanced' in its use of ICTs, to provide a value judgment on the impact of this use, or to impute a score to a particular country's related policy environment

The SABER-ICT framework presents a rubric through which current policy intent related to technology use in education can be analyzed. Utilizing the framework, an enterprising academic or consulting firm could no doubt attempt to build an index of sort, with individual scores assigned to the perceived state of policy intent along individual themes which are then combined in some way to arrive at a general composite 'score', against which countries could then be ranked in comparison with each other. Such efforts were considered by the creators of the SABER-ICT policy framework but abandoned, as a result of consultations with policymakers, experts, academics and practitioners who expressed serious doubts about the viability, technical integrity and policy relevance of such an exercise.

e. Best practice vs. worst practice

By its very nature, an attempt to map and analyze policy intent related to technology use in education largely focuses on what *should* be done. Conversely, policies are often silent on *what not to do*. While the collective knowledgebase about "what matters" when it comes to ICT use in education is rather shallow, a lot is known, based on observed practice, about what does not work.⁷ Related guidance in this regard – which may be quite useful, relevant and evidence-based -- is often absent from policies concerning ICT use in education.

f. Rapid developments and innovations in the technology sector challenge the abilities of policymakers to offer useful related policy guidance that is forward-looking

Technological advances often outpace the abilities of policymakers to keep up. As such, current policy intent and directives related to ICT use in education may, in many cases, be limited in their relevance going forward in certain key regards. Given the rapid state of advances in some (*although certainly not all*) regards, there is a danger that policymakers may attempt to '*drive by looking in the rear view mirror*'. Given perceptions that change is coming, and indeed is inevitable, users of the SABER-ICT policy framework may be tempted to benchmark their own policy environment against what is labelled 'advanced' in the SABER-ICT policy rubric, whether or not such a comparison is in fact relevant or useful, given the country's current context and related educational objectives.

In acknowledgement of the rapid changes which characterize the ICT in education field as a whole, and of the caveats and limitations noted here, the SABER-ICT policy framework should be viewed as a *work in progress*.

⁷ See *Worst practice on ICT use in education*, <http://blogs.worldbank.org/edutech/worst-practice>.

6. About SABER-ICT

As part of its larger *Systems Approach for Better Education Results* (SABER) initiative, the World Bank is supporting activities to help policymakers make informed decisions about how best to use information and communication technologies (ICTs) in pursuit of core developmental objectives in the education sector. **Today, many of the education systems that are popularly considered to be “high-performing” in their use of ICTs appear to have earned this designation for the wrong reason — not because they are able to point to rigorous data about the (cost-effective) impact of their ICT investments, nor because they can demonstrate how ICT use has enabled a particular reform process, but rather largely because they have “lots of ICTs”.** SABER-ICT aims to help change that situation by improving the availability of policy-related data, information, and knowledge related to using ICTs to improve the quality of education. SABER-ICT is being developed in close partnership with other development institutions, building on and complementing initiatives to improve the knowledgebase on use of ICTs in education.

SABER-ICT contains three major work streams:

Policy

- developing a framework to assist policymakers as they attempt to analyze and benchmark their own policies on ICT use in education against those of comparator countries around the world, identifying key themes and characteristics
- building a global database of policy documents on ICT use in education and doing a general review of these policies to serve as a foundation for the SABER-ICT policy framework

Implementation

- supporting the collection of key data related to the use of ICTs in education, as part of a larger international, multi-stakeholder initiative to improve the availability and quality of ICT data and indicators, particularly in the education sector in developing countries
- a series of topical essays on emerging topics and themes related to the implementation issues, including case studies of key organizations responsible for implementing policies on ICT use in education around the world

Impact

- a review of key messages from the emerging global knowledge base about what is known, and what isn't, related to the use of ICTs in education, especially in contexts common or relevant to education systems in developing countries

The World Bank's EduTech blog (<http://blogs.worldbank.org/edutech>) serves as an important dissemination mechanism for all work under SABER-ICT. As appropriate, individual working papers and short publications, typically drawing heavily on material made available as working drafts through the EduTech blog, will also be produced and published on a rolling basis.

7. About ICT use in education

Efforts to ‘connect all schools to the Internet’ or provide one laptop (or increasingly: tablet) per child’ are prominent in increasing numbers of countries,⁸ even some of the poorest. At least rhetorically, the promise and potential of the uses of a variety of new technologies to benefit a variety of educational objectives are increasingly to be found in the speeches and pronouncements of politicians and policymakers alike. In different ways, and perhaps with different goals and motives, families, private companies, enterprising academics, and a variety of other non-governmental actors also advocate for greater access to technologies in schools, and by teachers and learners. For many, the use of information and communication technologies (ICTs) in education offers a clear promise for accelerating learning, and a person’s facility for using technology is fast becoming a basic competency, even in some of the least developed countries in the world.

‘Revolution’ and evidence

“Technology”, it has been famously declared, “is revolutionizing education everywhere but in the classroom”.⁹ Indeed, despite large scale investments in ICTs by governments, and private investments by families and communities, the ‘impact’ of technology use in education is a topic hotly debated, and often difficult to determine, due to a variety of factors related to specific implementation modalities and contexts. While visions of smiling students using the latest education apps on their brand new tablets make for enticing photo opportunities, the actual record of implementation and achievement of many large-scale, government-supported projects to introduce and sustain the use of educational technologies over time are rather checkered. Indeed: Some of them present *cautionary tales of rather ambitious, and expensive, ‘failure’*.

While growing and improving in quality and rigor, the collective knowledgebase about ‘what works’ in ICT use in education, and what doesn’t, and how and why, remains rather weak, especially related to the contexts and realities in middle and low income countries. In addition, there is a paucity of basic data and documentation about what is actually happening in schools and classrooms. Much of the related research base comprises studies with quite small sample sizes, weak correlations, and/or self-reported data. Many studies that do identify positive impacts are from implementations and contexts that are highly specific and/or have been supported, directly or indirectly, by vendors or by other groups with a stake in research findings.

A focus on infrastructure and equipment

Most ICT-related initiatives in education in middle and low income countries to date have been focused more on supplying schools with computers and Internet connectivity than on integrating technology into curricula and daily teaching and learning processes. While such infrastructure-centric efforts may be necessary if (to adopt the language of many of its most ardent proponents) a ‘digital revolution is to transform learning’, evidence is clear that such activities are not in and of themselves sufficient to bring about noticeable positive impacts on teaching and learning practices and educational outcomes.¹⁰

⁸ See, for example: *Big educational laptop and tablet projects -- Ten countries to learn from* <http://blogs.worldbank.org/edutech/big-educational-laptop-and-tablet-projects-ten-countries>

⁹ This phrase, and notion, has been popularized by, and is most closely associated with, the American author Marc Prensky, author of such books as *Don't Bother Me Mom — I'm Learning and Teaching Digital Natives — Partnering for Real Learning*.

¹⁰ For an exploration of what is known, and what isn't, about the impact of technology use in education in middle and low income countries, a companion paper to this document is currently under development: *SABER-ICT – What Matters in Technology Use in Education: Literature Review and Knowledge Maps* (World Bank, forthcoming).

The varied uses of ICTs in education

Technology use in education can take many forms. Traditional textbooks can be digitized and made available to students in school computer labs or on mobile devices. Educational television and radio programming can reach students – and teachers – in remote villages, providing access to learning content and opportunities otherwise absent. Teachers and students can be networked together to form online communities to share information and support each other, whether across national borders or within an individual classroom. Teachers can project information on a classroom wall for viewing by students and archive their presentation materials for future study or re-use. Computer simulations and games can help provide students with new perspectives and insights about scientific phenomena in ways not previously possible, while promoting greater engagement with topics being studied. Students can learn and develop sets of so-called 21st century skills, which increasingly include, and are enabled by, the use of digital technology tools, and which can be assessed and measured through tests conducted using many of these same tools. More narrowly, students can develop skills in computer programming and coding, as part of efforts to better understand many of the forces that increasingly determine some of the key underlying processes and activities which lie at the heart of our increasingly digital societies and economies, as well as to contribute to and participate in such processes and activities. 'Technology use in education' encompasses both 'ICT in education' as well as 'education in ICT'.

The potential uses of ICT in education are not limited to the classroom. ICT can also allow better, more timely monitoring of the various dimensions of a national education system and is therefore a valuable tool for implementing a systems approach to education reform. ICT can lower the cost of implementing student learning assessments and can better link those assessment results to both teacher development and the allocation of education resources. ICT can also make it much easier to supply up-to-date information on teacher professional development programs to prospective trainees, as well as enable learning opportunities outside of formal school settings. By helping to capture data about processes and activities at the point of teaching and learning, and across schools and education systems, ICT can help document, click by click, what is actually happening in ways not previously possible, and to share these data with wider groups of decision makers and stakeholders than previously possible.

Challenges

At the same time, while the potential and promise of ICT use in education is clear in many regards, so too are related perils. The process of introducing new technologies, whether at a micro level at the point of learning or at the macro level across an entire education system, is almost inevitably disruptive in the short term, and can be difficult to manage. The technology itself may not always work, or work well, or work as planned.

Teachers may be saddled with new responsibilities for which they receive inadequate support and training, and indeed may be worried (and in this regard the words of some policymakers and pundits provide them with little consolation) about being 'replaced'. As a result, they may resist or complicate efforts to introduce and integrate new technologies in schools.

The costs associated with technology-related initiatives in the education sector can be quite large, and their magnitude, and who will bear them, are not always fully understood until the initiatives are well underway. In this regard, costs related to technology may not be that different to those related to many other 'inputs' (school infrastructure, teacher training, etc.). What is different, however, is often the enthusiasm and excitement that often accompany large scale government investments in educational technology initiatives when compared to other, more 'traditional' sorts of educational inputs. Decisions related to technology use in education can carry large opportunity costs. Do you buy more computers or hire more teachers (or pay the

teachers you already have better)? Where poor policies or practices are in place, simply extending them into the digital realm can have negative consequences.¹¹

Issues around student privacy, and data security, become more acute as new technologies are introduced into individual teaching and learning activities in ways that are increasingly integral and personal. In addition, the introduction of ICTs can (potentially) open a Pandora's Box of new inconveniences and threats as a result of things like so-called 'cyberbullying', intellectual property theft and 'cybercrime'.

Equity and the 'digital divide'

As the historian of technology Melvin Kranzberg has noted, "Technology is neither good nor bad; nor is it neutral."¹² Many government-supported efforts to introduce new technologies into schools are meant, in part, to help address issues related to equitable access to ICTs. That said, as the OECD has noted, "the digital divide in education goes beyond the issue of access to technology. A second digital divide separates those with the competencies and skills to benefit from computer use from those without."¹³ Indeed, the increased use of new technologies in education can actually further advantage groups already considered advantaged in many ways (e.g. children with educated parents and good teachers, who live in prosperous communities, speak majority languages or come from certain ethnic groups, etc.)¹⁴

ICT use in education as a separate policy area?

Some critics may argue that it is not appropriate to consider technology use in education as a topic separate from other policy domains in the education sector. 'Technology' is indeed a theme which cuts across other SABER 'policy domains' (e.g. teachers, student assessment, tertiary education¹⁵). That said, there are a few very practical reasons for considering it as a separate area for consideration by policymakers. Most notably, many countries currently issue explicit policy guidance related to the use of ICT in education, and there are institutional units within government and external groups whose activities are explicitly directed and governed by such policies. Whether this approach makes sense on a theoretical level, especially where groups advocate for policies which take a more systemic, rather than thematic, approach, to policymaking in the education sector, it nevertheless reflects current practice within most ministries of education and education systems around the world. In addition, by highlighting common issues across multiple policy domains, considerations of ICT use in education can provide a useful lens through which certain key cross-cutting issues and challenges might be illuminated or understood. It is perhaps also worth noting that many key actors and constituencies outside the education sector – including those from the private sector – advocate for explicit policy attention related to the use of technology in education, and so focused attention on related themes can help respond to, and anticipate, the actions of such increasingly influential

¹¹ 'If you are pointed in the wrong direction, technology will help you get there more quickly', notes Wadi Haddad in the *ICT in Education Toolkit for Policymakers, Planners and Practitioners*. And, it could be noted, 'more expensively' as well.

¹² This is commonly known as Kranzberg's First Law of Technology. See Kranzberg, Melvin (1986), *Technology and History: "Kranzberg's Laws"*, *Technology and Culture*, Vol. 27, No. 3, pp. 544–560, for more information.

¹³ See, for example, *New Millennium Learners: Initial findings on the effects of digital technologies on school-age learners* (OECD: 2007).

¹⁴ This is sometimes called *The Matthew Effect in Educational Technology*; see a related post on the World Bank EduTech blog, <http://blogs.worldbank.org/edutech/matthew-effect-educational-technology>. While discussions of potential 'Matthew Effects' related to the use of ICTs is relatively new, they can be seen as natural extensions of considerations of the 'Matthew Effect' in education more broadly. See, for example: Merton R. K. *The Matthew Effect in Science: The reward and communication systems of science are considered*. *Science*. 1968 Jan 5;159(3810):56-63. Walberg, H. J., & Tsai, S. L. (1983). *Matthew effects in education*. *American Educational Research Journal*, 20, 359–373. Stanovich, K. E. (1986). *Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy*. *Reading Research Quarterly*, 21, 360–406.

¹⁵ See the SABER web site, saber.worldbank.org, for more information.

groups within the economies and political structures of many countries related to education policies.

Exported, and imported, ‘solutions’

Most ICT tools, and the ICT-enabled processes and activities have historically been designed for, and first introduced into, education systems in the ‘advanced’ countries of the OECD, meant to address needs and contexts of teachers and learners in such places. While a recognition of the size of markets outside the advanced countries of the industrialized ‘North’ is leading to more firms to develop ICT-enabled product and services to meet the needs of education systems in the developing countries of the global ‘South’ (and, it should be noted, firms and groups which are themselves from such places are growing in size and market relevance), it is nevertheless still true that educators and policymakers in much of the world are attempting to adapt tools designed for other purposes and users, in other places, to their own local realities and needs.



8. About ICT use in education policies and related policymaking processes

It is an abiding (and fully understandable) conceit of many governmental policymakers that 'policy drives practice'. This may or may not be true, depending on the nature and substance of a specific policy and local context. Useful policies and policy guidance can facilitate, enable and encourage certain desirable actions and outcomes; inappropriate or 'bad' policies can do the exact opposite.

Technology use in education: a faith-based initiative?

In many ways, the lack of reliable related data and a deep, relevant knowledgebase informed by rigorous research has led to a situation where investments in educational technologies in many countries can perhaps be accurately, if rather uncharitably, characterized as 'faith-based initiatives'. Even where policymakers are not taken with a general faith in technology, they may profess a belief in the potential of technology use in education.

Speed of change, and change over time

It is an acknowledged truth in many quarters that, even within a particular educational reform process, or indeed where no reform process is on-going, the pace of technological innovation outruns the pace of institutional and policy innovation. Whether they are reactive or visionary (or currently inattentive), understanding the current stated intentions of policymakers related to technology use in education can be critical in helping to plot the best way forward. *It should be noted that what appears to matter most to policymakers, at least according to the official policy documents that they draft and circulate related to ICT use in education, may not in fact be what actually matters most from the perspectives of students, teachers, school leaders, parents and local communities, politicians, local industry, academics, researchers and other various key stakeholders and beneficiaries.*

Reasonable people can disagree on whether or not the components, directives, goals and perspectives commonly found in current ICT/education policies are what they should contain. One (decidedly modest, perhaps) initial goal under the World Bank's SABER-ICT initiative is to try to document what such policies actually do contain, in the belief that such information is operationally relevant to ministries of education and their partners who are devising such policies going forward.

Policies change and evolve over time, often along a somewhat predictable path. A policy developed by country X in 2001 may be relevant to country Y in 2015, both as a marker for historical policy development over time, and because the context of country X in 2001 may more closely correspond to the context of country Y in 2015 than whatever policy is in place in country X in 2015.

Believing that technological innovations will often outpace the ability of policymakers to innovate on related policy issues (a belief which notably carries currency among some groups of practitioners leading educational technology initiatives) need not imply that policies related to technology use in education have no value. Articulating some sort of principle or rule to guide decisions (which is a basic definition of what a policy is) can be quite important, even in areas that are fast moving, as is the case when considering and planning for technology use in an education system. Indeed, it may be *especially* in areas that are rapidly changing (or perceived to be) that policy direction can be most helpful.

Promoting, or constraining, innovation

In some cases, 'getting out of the way' can be a relevant policy choice. When it comes to the development and use of new technologies, the absence of related policy guidance or directives can sometimes enable useful action and activity in certain areas -- especially those which are changing quickly, as can often be the case when new technologies and technology-enabled actions are being introduced and evolving rapidly.

Whether in the end this is a result of reasoned and deliberate decisions by a policymaker, or occurs as a result of (for lack of a better term) governmental neglect or inattention, there is no denying that, if and where people and groups are provided the space, tools, incentives and means to innovate, they may just do so. Whether such actions or innovations have positive or negative effects (and often they of course have *both* positive and negative effects), policymakers can play key roles in amplifying, inhibiting, or re-directing such effects to help serve various larger policy goals and objectives.

Policies take different forms

Policies that contain guidance on issues related to 'ICT use in education' take many forms around the world. Some places have formal, official, 'national ICT/education policies'. In other places, the operative policy is to be found as the 'ICT' component of an education policy, or conversely in the 'education' component of a national ICT (or its equivalent, e.g. ICT4D, IT, e-society, etc.) policy or a policy in some related field (like workforce development). Some places have specific policies for certain sub-sectors -- a common one is a 'policy on ICTs in higher education'. Often times, to the extent that there is a 'policy' in this area, is it actually to be found by cobbling together information from policies in many of these areas (it should be noted that these sometimes conflict).

In some countries, 'draft' ICT/education policies are widely circulated and function as de facto policies themselves. There are many reasons for this, but one common explanation is that (rightly or wrongly) policies in this area need to change quickly, and the process for formally ratifying policies of this sort through existing, formal channels may be so slow and cumbersome that the groups in charge of implementation don't have time to wait.¹⁶

Best practice vs. relevant practice

Even in some of the poorest countries of the world, policymakers – or their advisors – may be aware of some of the leading 'best practice' policy examples from around the world. Documents like the National Education Technology Plan of the United States, or the various ICT/Education "masterplans" from Singapore, are lauded for their comprehensiveness, vision and directive value and are often consulted and referenced around the world. This may occur not only because they are excellent policy documents, but also because they are so easy to find via major search engines, and, at a more abstract level, simply because these places are well known globally as leaders in educational technology issues. That said, a 'best practice' example from one country may not in practice be a relevant example for another country.

"We think we need to develop a national policy to help guide our efforts to use information and communication technologies [ICTs] in education. What should such a policy contain?"

This question is a common starting point for the development of a national educational technology policy. Sometimes this query arises in response to the recognition that a country is

¹⁶ Sometimes de facto ICT/education policies may not take the shape that one assumes or expects. In practice, the operative policy could even be something as informal and as a PowerPoint file regularly presented by the Minister of Education, as happened in Rwanda, or a special notice circulated by government agency, as in England or Uruguay.

about to spend a lot of money (e.g. to buy computers for schools), and the related realization that there is no policy in place to help guide this effort. In other cases, it is a result of recognition that there has been no or little related policy guidance in this area in a country, despite the fact that lots of money has already been spent -- and that this spending hasn't worked out quite as well as hoped.

Some countries have had policies in place -- sometimes quite good policies -- and they are now looking to 'move to the next level', keen to learn from examples in other countries, especially because the challenges and opportunities potentially offered by the emergence of new, (more) affordable technologies are, indeed (perceived to be) "new".

One approach to answering this general question is to initiate a systematic, consultative process to formulate and policies related to, and plan for, the deployment and use of educational technologies, as part of a wider policy formulation and planning process that looks at broader developmental and education goals, and then seeks to investigate and articulate how and where the use of ICTs can help meet these objectives. This is a process that was (for example) followed as part of the World Bank's World Links program in the late 1990s and early 2000s, and which was extended and formalized through the development and use of the ICT in Education Toolkit for Policymakers, Planners and Practitioners (see related item below). Of course, not all policy planning processes are as systematic and well laid out as these were -- many of them have been, and are in practice, rather ad hoc.

Another way to answer this general question (and these approaches aren't mutually exclusive) is to investigate and analyze what policies in other countries contain, and then compare this analysis with a country's own policies. Many policymakers in middle and low income countries, to the extent they look outside of the borders of their own countries for insights into how to provide useful direction for their education systems as various ICTs are introduced into them, look to some of the most 'advanced' countries in the world for policy models. Just because something is considered a 'best practice' example, is easy to find online, or comes from an 'advanced' country, doesn't mean it is the most relevant (in whole or in part) to another country's particular circumstance or context, however. This is especially true for many middle and low-income countries seeking to benchmark their policies not only against what 'leading' or 'advanced' countries are doing in this area, but also what their neighbors, and countries 'more like them', are seeking to do. *What to do in such a circumstance?* Some countries have found that, if particular policies they find are not that relevant to their context, it might be useful to turn to seek the guidance of international experts on emerging consensus in this area. That said, this still tends to yield advice based on leading-edge country examples. While the policy directions of places like the United States or Singapore, South Korea or the UK may indeed typify or embody leading edge 'expert' thinking, this may not always be what is most needed, or indeed relevant, for less developed countries.

It is possible to concede that policy intent doesn't necessarily translate into action, and that what's written on a page or communicated in a policy speech can be unrealistic, or interpreted in different ways (or even ignored), while at the same time acknowledging that such policy articulation and guidance nevertheless has some value.

ICT in education policymaking in practice:

Lessons from the drafting of national educational technology policies

Initiated in 2004 by the ICT/education team at UNESCO-Bangkok, which was later joined by a number of partners, including the infoDev program of the World Bank, which financed its completion, the ICT in Education Toolkit for Policy Makers, Planners and Practitioners was utilized as part of policy planning and review processes in over thirty middle and low counties in the course of the subsequent decade.

In support of face-to-face and online interactions that typically lasted for many months (and in a few cases, years), mainly in countries in East Asia and the Pacific, the Toolkit provided interactive instruments and step-by-step guidelines to assist education policy makers, planners and practitioners in the process of 'harnessing the potential of ICTs to meet educational goals and targets efficiently and effectively'. The toolkit was designed with the needs of two specific groups in mind: (a) key decision makers in countries and educational institutions as they struggled with the challenge of introducing and integrating ICTs into education; and (b) program officers and specialists in international development agencies as they identified, prepared and appraised ICT-in-education projects or ICT components of education projects.

A number of key lessons emerged from this effort which might be quite relevant to policymakers involved in similar efforts going forward:

1. Who participates is often as important as what is decided

When a process kicks off to formulate a new policy related to ICT use in education, it (almost) always results in the development of such a policy. Too often, the 'success' of a related policy development process is judged by whether or not a policy was actually developed, disseminated and implemented. 'Success' from the perspective of the World Bank's SABER initiative, however, means something different: whether a policy results in a positive impact on teaching and learning for all. When it comes to policies related to ICT use in education, experience from a decade of experience in implementing in the *ICT in Education Toolkit* suggests that 'success' in practice can be as much a function of which groups and stakeholders participated in the policy formulation process as what the policy itself eventually contains. In other words: Who is in the room can be critically important! Policymaking around technology use in education is often challenging in new ways because it can (or should) involve or encompass multiple actors and stakeholder groups, from within and across government, as well as private firms and civil society groups. In some countries, ICT/education policy formulation is led by the ministry of education, in other countries the ICT or telecom ministry takes the lead, in still others a special office under the president or prime minister may play the lead role (in some dysfunctional policy environments, all three groups may independently develop their own policies in this regard!). Finding a way to coordinate the policymaking activities and functions of such groups, as well as the various implementation roles of key stakeholders, can be very difficult, but the lines of communication that are opened as a result of trying to do so can be very important when it comes time for implementation. Even where a resulting policy may be 'bad' or inadequate/incomplete, making broad stakeholder engagement a key part of the related policymaking process can represent a key practical success going forward.

2. Upcoming procurement activities often catalyze policy formulation (and re-formulation)

A key factor catalyzing many efforts to create new policies related to technology use in education in schools is the fact that a large-scale procurement of ICT equipment looms on the horizon. In many cases, existing policies provide little guidance related to what is being promised by political leaders (e.g. large numbers of schools are to be connected to the Internet, or will receive computer labs, or students are to receive laptop computers). In other words, 'the technology tail is wagging the policy dog'. One consequence is this phenomenon is that the initial focus of policy development is to help guide the roll-

out of new technologies to schools, and not in how such technologies can be used in support of existing policy goals and objectives.

3. A single group is often core to the implementation of ICT/education policies

Whether policymaking authority is diffuse or highly centralized, a single group is often core to the implementation of national educational technology policies in middle and low income countries.¹⁷ In some cases this is a specific department or unit of a government ministry, in others it may be a quasi-autonomous agency under the direction of one or more government ministries. Including representatives from this group as explicit part of the process of related policy formulation can help surface valuable practical perspectives and lessons from experience which can help ground the development of new policies in an understanding of what is possible and 'do-able'.

4. The private sector can play a key role

In many national educational technology policies, a key role is identified for a number of private groups (both companies and NGOs) in the implementation of such policies. This can occur for a variety of reasons: companies and NGOs may have more relevant implementation capacity and know-how, they may be more up-to-date on relevant technology trends, and they may be more cost-efficient than their public sector partners. As a practical matter, such groups often provide informal advice and guidance to policymakers, based on their practical experiences and know-how -- and, it is important to note, their own self-interests as well. Figuring out ways to incorporate such voices within the policymaking process can be important, both as a bridge to eventual implementation efforts and to promote greater transparency around such activities. Government authorities may not have existing relationships with many such 'non-traditional' actors, but involving them in the policymaking process can provide a way to help build such bridges.

5. Technological changes typically outpace the abilities of policymakers to keep up

While ICT/education policymaking is often quite forward-looking in nature, at least rhetorically, it is also the case that it can be as much about helping to formalize practices which are already on-going within an educational system which had previously happened with little or no government guidance or oversight. When it comes to policymaking around ICT/education issues, there is often a tension between how much government should lead, and how much it should follow things which are already happening within individual schools and communities. When it comes to making accurate prognostications about the future of technology use, education officials do not generally have a track record of great success, and there is always a danger that ill-conceived or overly ambitious policies can stifle, rather than supported, the emergence of technology-enabled innovations within various parts of an education system. At the same time, while a lack of related policy guidance can open up spaces for innovation, it can also lead to great inefficiencies, and allow for new (digital) divides to develop, and for longstanding divides within an education system or society to widen.

6. Equity issues and concerns can present fundamental challenges within policymaking processes related to ICT use in education

Desires for action and to demonstrate 'quick wins' can greatly complicate goals related to equity and fairness. Do you first connect the schools which are easiest to connect, or train the teachers who are already the 'best'? Such school and teachers are often found in communities where students already possess a number of advantages (related to wealth, for example, or the fact that they live in urban areas). While rhetoric around helping to close the 'digital divide' can mark key opening passes of ICT/education policies, and such sentiments can be an important catalyst for the development of an

¹⁷ For more on this phenomenon, see a companion paper in the SABER-ICT series: Trucano, M. & Dykes, G. (2016). *Building and sustaining national ICT/education agencies: Lessons from international Experiences as well as a series of related country case studies.*

ICT/education policy, great care needs to be taken to insure that individual components of such a policy align with, and don't stand in practical opposition to, a more general policy interest in promoting equity.

7. The technologies and devices introduced into education systems as a result of ICT/education policies can help monitor the implementation of these same policies

When introduced into schools and education systems, information and communication technologies (ICTs) are by their very nature dual- (or multi-)use. Connecting schools to the Internet and providing students with access to laptops is often largely seen by policymakers to represent new possibilities to disseminate new or additional learning materials to teachers and students. While this is undoubtedly the case, the existence of such connected tools in the hands of teachers, students and school administrators offers new ways for government to monitor the extent to which its policies are actually impacting activities at the school and classroom level. In other words, an ICT/education policy which broadens access to connected digital tools and devices can help establish a very important feedback loop to help policymakers better understand what (if anything) might be changing in the lives of schools and learners as a result of such policies. For many policymakers, this represents something fundamentally new.



Annex A: About SABER

The *Systems Approach for Better Education Results* (SABER) is a World Bank initiative to produce comparative data and knowledge on education policies and institutions, with the aim of helping countries systematically strengthen their education systems. SABER evaluates the quality of education policies against evidence-based global standards, using new diagnostic tools and detailed policy data collected for the initiative. The SABER country reports give all parties with a stake in educational results—from administrators, teachers, and parents to policymakers and business people—an accessible, objective snapshot showing how well their country's education system policies are oriented toward promoting Learning for All.

SABER is based on the systems approach to education analysis and reform, which is at the heart of the *World Bank Education Strategy 2020, Learning for All*. The systems approach recognizes that improving education requires much more than just increasing resources: it requires strengthening all factors that improve learning for all children and youth. This means making sure that the system's policies for governance, accountability mechanisms, information systems, financing rules, and school management are all aligned toward achieving learning for all. SABER embodies this systemic definition of what types of policies matter, both within each domain and across domains.

Education outcomes — such as enrolment, completion, and student learning — depend on many factors. An important one is the quality of the policies and institutions governing the system, but until now there has been too little systematic, detailed information on them. SABER's main focus is to collect data on these policies and institutions and to analyze their quality.

In SABER, the detailed data-gathering and analysis are organized by "domain", or areas of education policymaking within an education system. These include cycles of the system (such as Early Child Development (ECD) and Tertiary Education), types of quality resources and supports (such as Student Assessment and Teachers), areas of governance and finance (such as EMIS and School Finance), and cross-cutting areas (Education Resilience, Equity & Inclusion and ICT).

More information about SABER is available on the related web site from the World Bank, <http://saber.worldbank.org/>.



Annex B: ICT in education data

The UNESCO Institute for Statistics (UIS) is the United Nations body mandated to administer data collections on the availability, use and impact of ICT in education in order to establish internationally-comparable and policy-relevant indicators. UIS does this by distributing questionnaires to national statistical agencies. These questionnaires were initially developed with the International Working Group on ICT Statistics in Education (WISE), which was established by the UIS. The key results of this working group were collected together and published by UIS in its *Guide to Measuring Information and Communication Technologies (ICT) in Education* (Montreal: 2009). Subsequently, UIS piloted regional questionnaires in order to gather internationally comparable data; the results of this work has been collected in a series of regional survey publications. In 2014, in anticipation of the administering its first global survey on ICT use in education in late 2015, UIS assembled a technical advisory panel (TAP) meeting to inform the redesign of the UIS questionnaire, the selection of new core indicators, and other methodological issues to keep pace with the evolving policy needs of countries related to ICT in education.

The World Bank has participated actively in both the Working Group on ICT Statistics in Education and the follow-on technical advisory panel, and the data collection work of UIS related to ICT use in education is an important and explicit pillar supporting and informing the World Bank's SABER-ICT initiative.

UIS ICT in education indicators

from: UIS. (2009). *Guide to Measuring Information and Communication Technologies (ICT) in Education*. Montreal: UNESCO Institute for Statistics.

Core list of ICT/education indicators

- ED1 Proportion of schools with a radio used for educational purposes
- ED2 Proportion of schools with a television used for educational purposes
- ED3 Proportion of schools with a telephone communication facility
- ED4 Learners-to-computer ratio in schools with computer-assisted instruction
- ED4bis Learners-to-computer ratio
- ED5 Proportion of schools with Internet access by type
- ED6 Proportion of learners who have access to the Internet at school
- ED7 Proportion of learners (by gender) enrolled at the post-secondary non-tertiary and tertiary level in ICT-related fields
- ED8 Proportion of ICT-qualified teachers in primary and secondary schools
- EDR1 Proportion of schools with electricity (reference indicator)

Full list of ICT/education indicators (by theme)

(*core indicator; ** reference indicator)

Infrastructure

- EDR1 Proportion of schools with electricity **
- ED1 Proportion of schools with a radio used for educational purposes *
- ED2 Proportion of schools with a television used for educational purposes *
- ED3 Proportion of schools with a telephone communication facility *
- ED4 Learners-to-computer ratio in schools with computer-assisted instruction *
- ED4bis Learners-to-computer ratio *
- ED5 Proportion of schools with Internet access by type *

ED22 Proportion of schools with computer-assisted instruction
ED23 Proportion of schools with Internet-assisted instruction
ED24 Proportion of educational institutions owning licence for or subscribing to scientific digital libraries
ED24bis Proportion of educational institutions owning licence for or subscribing to virtual experiment laboratories
ED25 Ratio of learners-to-computer connected to Internet
ED26 Average number of computers per educational institution
ED27 Average number of computers connected to the Internet per educational institution
ED28 Proportion of student-owned computers available for pedagogical purposes
ED29 Proportion of all computers available for pedagogical purposes
ED30 Proportion of all computers available for administrative purposes
ED31 Proportion of schools with a website
ED32 Proportion of schools with a website hosting students' and teachers' blog pages
ED33 Proportion of educational institutions offering ICT-enabled distance education programmes

Teaching staff development

ED8 Proportion of ICT-qualified teachers in primary and secondary schools *
ED34 Proportion of schools with ICT support services
ED35 Proportion of primary and secondary-school teachers trained via ICT-enabled distance education programmes
ED36 Proportion of primary and secondary-school teachers who teach basic computer skills (or computing)
ED37 Proportion of primary and secondary-school teachers who currently teach subject(s) using ICT facilities
ED38 Proportion of primary and secondary-school teachers trained to teach subject(s) using ICT facilities
ED39 Ratio of learners-to-teachers of basic computer skills (or computing)
ED40 Ratio of learners-to-teachers using ICT to teach

Usage

ED6 Proportion of learners who have access to the Internet at school *
ED41 Proportion of learners entitled to use computer laboratories at school as a pedagogical aid
ED42 Proportion of educational institutions providing an email account to all teachers
ED43 Proportion of educational institutions providing an email account to all learners

Participation, skills and output

ED7 Proportion of learners (by gender) enrolled at the post-secondary non-tertiary and tertiary level in ICT-related fields *
ED44 Proportion of learners enrolled in grades with ICT-assisted instruction
ED45 Proportion of learners enrolled in grades where basic computer skills (or computing) are currently taught
ED46 Proportion of learners (by gender) who graduated last academic year in ICT-related fields at the post-secondary non-tertiary and tertiary level
ED47 Proportion of learners (by gender) enrolled at the tertiary level in ICT-enabled distance education programmes
ED48 Proportion of learners who successfully completed a basic computer skills (or computing) course in the last academic year

Outcomes and Impact

ED49 Promotion rate of learners in grades receiving ICT-assisted instruction
ED50 Promotion rate of learners in grades not receiving ICT-assisted instruction
ED51 ICT-assisted instruction performance ratio



Equity

ED52 Proportion of rural schools with ICT-assisted instruction

ED53 Number of female graduates per 1000 male graduates in ICT-related fields

The following posts on the World Bank's EduTech blog [<http://blogs.worldbank.org/edutech>] may provide useful additional context and related insight:

- *Collecting data about educational technology use in *all* countries in the world*
[<http://blogs.worldbank.org/edutech/collecting-data-about-educational-technology-use-all-countries-world>]
- *How many schools are connected to the Internet?*
[<http://blogs.worldbank.org/edutech/how-many-schools-are-connected-internet>]
- *Broadband for schools?*
[<http://blogs.worldbank.org/edutech/broadband>]
- *Surveying ICT use in education in Asia*
[<http://blogs.worldbank.org/edutech/surveying-ict-use-education-asia>]
- *Surveying ICT use in education in five Arab States*
[<http://blogs.worldbank.org/edutech/surveying-ict-use-education-five-arab-states>]
- *Surveying ICT use in education in Latin America & the Caribbean*
[<http://blogs.worldbank.org/edutech/surveying-ict-use-education-latin-america-caribbean>]
- *Surveying ICT use in education in Europe*
[<http://blogs.worldbank.org/edutech/surveying-ict-use-education-Europe>]
- *Comparing ICT use in education across countries*
[<http://blogs.worldbank.org/edutech/UIS-indicators>]
- *How to measure technology use in education*
[<http://blogs.worldbank.org/edutech/how-to-measure-technology-use-in-education>]

Annex C:

How the SABER-ICT policy framework was constructed

The process by which the SABER-ICT policy framework was constructed was quite different from the process by which policy frameworks were built for other policy domains considered in the World Bank's *Systems Assessment for Better Education Results* (SABER) initiative.

There were two major reasons that a different approach was undertaken for SABER-ICT:

- In many other SABER domains, a framework was constructed based on a review of 'what works' in a particular policy area, drawing on published research relevant to that particular policy domain, some of which extends back for many decades. Unfortunately, the state of rigor of the research base related to 'what works' when it comes to ICT use in education, especially as it relates to contexts and challenges common to many education systems in middle and low income countries, is, generally speaking, quite weak. This is especially true when compared to SABER policy domains like 'teachers', which can draw on a large body of published, peer reviewed research, and in which the World Bank and its development partners have long experience and established expertise in related issues. By comparison, the state of what is known about the impact of technology use in education is much shallower, and the development of a policy framework informed largely by this weak knowledgebase was considered impractical.
- Many other SABER domains then typically utilize the policy framework for their particular policy domain to construct questionnaires which are then used to investigate the current policy environment in individual countries. No such surveys were conducted as part of work under SABER-ICT, as no funding was available to support such activities.

Given the shallow evidence base and the lack of funding to do primary data collection, the SABER-ICT team instead began its work by considering a set of ICT/education policies from an initial set of 12 countries, a mix of high, middle and low income countries from each continent with a special attention to places commonly associated with large investments in educational technology initiatives (completed, underway or planned) as part of a desk review, in order to gain a general sense of what such policies contain and what form they take.

The working definition of an ICT/education policy document was deliberately quite broad. In addition to drawing on an internal collection of policy documents maintained by the World Bank's education team and individual contacts with ministries of education and specialist consultants around the world, document collections and lists maintained by GeSCI, UNESCO-Bangkok, the European Schoolnet, and the publication *Cross-National Information and Communication Technology* (IEA, 2009), were also very helpful. The specific title of a policy document was considered to be of lesser importance than its content and its apparent relevance and salience to government officials and implementation partners. (Sometimes what is officially labeled a 'plan' may in fact look quite like a 'policy', and vice versa; rather than try to make judgments about the difference, the team collected and analyzed both types of documents.) For more information on the process of document discovery, please see a related post on the World Bank EduTech blog, *How to identify and locate national ICT and education policies* [<http://blogs.worldbank.org/edutech/finding-policies>].

The team then analyzed these policies by country in order to identify sets of key common themes, in order to construct a draft general policy framework reflecting the content of these policies.

Next, the team collected and considered policy documents from an extended set of (21) countries, geographically and economically diverse, although with special attention to policy environments in East Asia and the Pacific.

Together with policy documents from the initial set of countries, these policy documents were analyzed according to this draft general policy framework, which was then further refined, with each theme sub-divided into four 'stages' of development, as with other policy frameworks developed for other policy domains under the World Bank's SABER initiative.

With the draft SABER-ICT policy framework constructed, policy documents from an additional set of 48 countries were considered, with the policy environment in all included countries analyzed individually and collectively. As a result of this final analysis, the proposed SABER-ICT policy framework was finalized.

In support of its work under SABER-ICT, the World Bank maintains an internal database of 'ICT and education policy documents' to help inform its related advisory and project work, drawing on the documents identified and analyzed as part of constructing the SABER-ICT policy framework.

It is important to note that policies that touch on issues related to 'ICT use in education' actually take many forms, and this diversity is reflected in the database. Some countries have formal, official, 'national ICT/education policies'. In other places, the operative policy is to be found as an, or the, 'ICT' component of an education policy, or conversely in the 'education' component of a national ICT (or its equivalent, e.g. ICT4D, IT, e-society, etc.) policy or some related field (like workforce development). Some places have specific policies for certain sub-sectors -- a common one is a 'policy on ICTs in higher education'.

Often times, to the extent that there is a 'policy' related to ICT use in education, it is actually to be found by cobbling together information from policies in many of these areas (it should be noted that these sometimes conflict). *For the purposes of work under SABER-ICT, all such policy documents are considered.* In addition, in some countries where there is no official policy, a draft policy (or policies), governmental directive or letter, or even in some cases a PowerPoint presentation by a minister or key government official, may provide *de facto* policy guidance, and are therefore included in this database.

For more information on the policy documents collected under SABER-ICT, please see the related '*Master list of ICT/education policy documents*' available on the World Bank's SABER web site [<http://saber.worldbank.org>] and the related post on the World Bank EduTech blog, *How to identify and locate national ICT and education policies* [<http://blogs.worldbank.org/edutech/finding-policies>].

Annex D: Common ICT/education policy frameworks: Notes on terminology differences

Under the World Bank's SABER work, four general 'stages' (sometimes called 'levels') of development are articulated, and policies and actions along all major 'policy domains' in the education sector (including those related to ICT use) are analyzed to see whether they are best labelled as (1) *latent*; (2) *emerging*; (3) *established*; or (4) *advanced*. In order to maintain consistency in the use of terms across all SABER 'domains', the SABER-ICT policy framework utilizes this same terminology.

It is important to note, however, that a similar sort of four-stage identification framework which pre-dates SABER has been in widespread use by many key global organizations involved in exploring issues related to technology use in education, including the World Bank, drawing on the 'Applied Morel's Matrix'. These four stages are: (1) *emerging*; (2) *applying*; (3) *integrating* (sometimes called *infusing*); and (4) *transforming*.

Given that this four-stage framework has been in widespread use within the global ICT/education community for over a decade,¹⁸ *i.e.* before SABER was conceived, that the World Bank itself played a role in endorsing the common use of these four stage names within the global ICT/education community as part of its participation in the Working Group on ICT Statistics in Education,¹⁹ and that these four stage names are used in the conceptual framework underlying the work of the UNESCO Institute for Statistics (UIS) in its efforts to collect globally comparable data related to ICT use in education,²⁰ the following chart has been produced in order to provide an easy translation between the related terminology used in all of the SABER policy frameworks (including SABER-ICT) and the Applied Morel's Matrix:

Stage	SABER	Applied Morel's Matrix
1	latent	emerging
2	emerging	applying
3	established	integrating (infusing)
4	advanced	transforming

The potential for confusion in this regard (especially given that the term 'emerging' is used to denote stage 2 in the SABER framework, and stage 1 in Morel's Matrix) is noted, and regrettable.

¹⁸ See, for example, the *Performance Indicators on ICT for Education Matrix* (UNESCO-Bangkok, 2004), joint publication from the European Commission Joint Research Centre and OECD, *Assessing the effects of ICT in education - Indicators, criteria and benchmarks for international comparisons* (Scheuermann & Pedro, 2009).

¹⁹ The organizations participating in this effort originally comprised the 'Working Group on ICT Statistics in Education (WISE)'. With the completion of the first stage of this work, which culminated in the publishing of the *Guide to Measuring Information and Communication Technologies (ICT) in Education* (UIS 2009), and the mainstreaming of this data collection effort within the larger survey efforts at UIS, WISE has been converted to become a Technical Advisory Panel (TAP), helping to inform UIS's ongoing efforts in this area.

²⁰ The UNESCO Institute for Statistics (UIS) is the statistical office of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and is the UN depository for internationally comparable statistics in the fields of education, science and technology, culture and communication. The most recent information about UIS's efforts in this area can be found at <http://www.uis.unesco.org/Communication/Pages/ict-education.aspx>.

Annex E: Notable national ICT/education policies

Korea has mainstreamed considerations of ICT use within its national ICT policies. Its various specific policies and plans related to ICT use in education have been models for the plans and policies of many other countries, beginning with its *Comprehensive Plan for Education in the Information Age* (1997), continuing with its *Education in the Information Age: Introduction on the Policies and Development of Educational ICT* (2005), its *2008 Plan for the Promotion of the Educational ICT*, and especially through its an annual series of white papers on *Adapting Education to the Information Age*, which review existing policy implementation processes.²¹

Singapore's series of *Masterplans for ICT in Education*²² are considered by many to represent global good practice models of educational technology policies. According to the Singapore Ministry of Education,²³ the "Masterplans for ICT in Education drive the use of ICT in education. The underlying philosophy of the Masterplans is that education should continually anticipate the needs of the future and prepare pupils to meet those needs." The first *Masterplan for ICT in Education* (1997-2002) laid a strong foundation for schools to harness ICT, particularly in the provision of basic ICT infrastructure and in equipping teachers with a basic level of ICT integration competency, which achieved a widespread acceptance for its use in education. The *second Masterplan for ICT in Education* (2003-2008) built on this foundation to strive for an effective and pervasive use of ICT in education by, for example, strengthening the integration of ICT into the curriculum, establishing baseline ICT standards for students, and seeding innovative use of ICT among schools. The broad strategies of the *third Masterplan for ICT in Education* (2009-2014) were to strengthen integration of ICT into curriculum, pedagogy and assessment to enhance learning and develop competencies for the 21st century; to provide differentiated professional development that is more practice-based and models how ICT can be effectively used to help students learn better; to improve the sharing of best practices and successful innovations; and to enhance ICT provisions in schools to support the implementation of mp3. The *fourth Masterplan for ICT in Education* (2015-2020) continues to build on the achievements of the first three Masterplans, and broadens the focus beyond Self-Directed Learning and Collaborative Learning to the Total Curriculum. In mp4, ICT is used productively to develop knowledge through subject mastery, skills through 21st Century Competencies, and attitudes through responsible digital citizenry. mp4 is also aligned to MOE's direction towards student-centric and values-driven education.²⁴

The **United States** has been a leader in policy formulation related to technology use in education. The *National Education Technology Plan of the United States 2010: "Transforming American Education"*²⁵ calls for "revolutionary transformation rather than evolutionary tinkering." It "recognizes that technology is at the core of virtually every aspect of our daily lives and work" and "presents a model of learning powered by technology, with goals and recommendations in five essential areas: learning, assessment, teaching, infrastructure, and productivity. The plan also identifies far-reaching "grand challenge" R&D problems that should be funded and coordinated at a national level." Previous U.S. national education technology plans include

²¹ The series of annual white papers, *Adapting Education to the Information Age*, are available on the web site of the Korean Education Research & Information Service (KERIS0, the country's national ICT/education agency. http://english.keris.or.kr/es_ac/es_ac_210.jsp

²² Singapore's masterplans are available through its Ministry of Education web site, <http://www.moe.gov.sg/>.

²³ MOE Launches Third Masterplan for ICT in Education, August 5, 2008, <http://www.moe.gov.sg/media/press/2008/08/moe-launches-third-masterplan.php>.

²⁴ Opening Address by Dr. Ng Eng Hen, Minister for Education, August 5 2008, <http://www.moe.gov.sg/media/speeches/2008/08/05/opening-address-by-dr-ng-eng-h-1.php>.

²⁵ ²⁵ *National Education Technology Plan* (Office of Educational Technology, U.S. Department of Education, 2010), <http://tech.ed.gov/netp/>.

Toward A New Golden Age In American Education—How the Internet, the Law and Today's Students Are Revolutionizing Expectations (2004); *eLearning: Putting a World-Class Education at the Fingertips of All Children* (2000); and *Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge* (1996).

England's policy documents such as the *Fulfilling the Potential Transforming teaching and learning through ICT in schools* (2003) and *Next Generation Learning* (2009) policy and implementation plans have been widely cited as models during educational technology planning processes around the world.²⁶

Namibia's *ICT Policy for Education* (2004)²⁷ identifies "five distinct development areas for the use of ICT": (1) Investigation and Development of Appropriate ICT Solutions; (2) Deployment of ICT; (3) Maintenance and Support of ICT; (4) ICT Literacy; and (5) ICT Integration. From a global perspective, it is especially notable in that it explicitly references and draws on other related national policy documents, including that national "Vision 2030"; NDP2 (related to computer literacy); the "Strategic plan for The Ministry of Basic Education"; the "Public Service Information technology Policy"; and a national policy framework related to libraries.

Mozambique's *Technological Plan for Education 2011: Information and Communications Technologies to Enhance Education in Mozambique*²⁸ comes in three parts: (1) a Strategy Paper with a medium and long-term view for education and ICT; (2) a Five-Year Action Plan; and a related (3) Communication and Mobilization Plan.

Kenya's *National ICT Strategy for Education and Training* (2006) reviews twelve priority area to "determine challenges, appropriate responses and expected outputs", related to establish policy framework; digital equipment; connectivity and network infrastructure; technical support; harnessing emerging technologies; digital content development; integration of ICTs in education; training; research and development; partnerships and resource mobilization; legal and regulatory framework; and monitoring and evaluation.

Suriname's *National Policy and Strategy on ICT in Education* (2013) summarizes the results of a multi-stakeholder consultation process, articulating policy guidance related to (1) learning process and learning materials; (2) teaching; (3) enabling learning infrastructure; (4) school management; and (5) community environment and calling for the creation of a related coordinating body to help guide policy implementation.

The *ICT in education policy for Antigua and Barbuda* (2013) may be of particular interest to other small island developing states, especially to the extent that it identifies roles for a number of key institutions and agencies, and its emphasis on 'openness' related to promoting an "open culture of research and information-sharing" and the use of open educational resources.

²⁶ ICT/education policy documents from England are available via the UK's National Archives web site, nationalarchives.gov.uk/.

²⁷ *ICT Policy for Education* (Ministry of Education, Republic of Namibia, 2004), http://www.nied.edu.na/publications/AdditionalDocuments/Published_ICT_Policy_2005-15March2005.pdf

²⁸ *Technological Plan for Education 2011: Information and Communications Technologies to Enhance Education in Mozambique* (Ministry of Education, Republic of Mozambique, 2011), http://www.ptemocambique.com/index.php?option=com_content&view=article&id=120&Itemid=298&lang=en

Annex F: The SABER-ICT policy framework in brief

1. Vision and planning

- Having a vision
- Linking it to other policies (including those ‘outside the sector’)
- Providing a mechanism for funding
- Authorizing authority to oversee implementation
- Engaging the private sector

2. Infrastructure

- Ensuring adequate power
- Providing sufficient equipment and networking infrastructure
- Enabling sufficient technical support and maintenance

3. Teachers

- Providing ICT-related training (technical and pedagogical) for teachers
- Identifying a set of related teacher competency standards
- Supporting teachers in their use of ICT in the classroom over time
- Building awareness among and support for school administrators, as a support for ICT use by teachers and learners

4. Skills and competencies

- Identifying ICT literacy / digital competency standards, and offering related training, support, assessment and certification
- Articulating and supporting ICT-enabled lifelong learning opportunities

5. Learning resources

- Supporting the development, dissemination and utilization of digital learning resources

6. EMIS

- Supporting the collection, processing, analysis, and dissemination of education-related data to relevant stakeholders

7. Monitoring and evaluation, assessment, research and innovation

- Support for monitoring ICT use in education and evaluating its impact on teaching and learning
- Utilizing ICTs to support assessment activities
- Dedicated support for exploring innovative uses of ICTs in education

8. Equity, inclusion and safety

- Prioritizing “pro-equity” provisions and approaches related to the use of ICTs in education
- Articulating and supporting efforts to promote ethic practices related to ICT use in education, including the safety and security of data and appropriate privacy provisions

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This paper was developed as a result of a review of ICT/education policy documents from 81 countries; a list of these policy documents, *Master list of ICT/education policy documents*, is maintained and updated on the SABER website [saber.worldbank.org]. Some representative policies are listed in Annex E, *Notable national ICT/education policies*. Information on sources can be found in Annex C, *How the SABER-ICT policy framework was constructed*. In addition, the following resources notably informed the drafting of this paper.

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