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DRAFT 4 REPORT

QUALITY EDUCATION IN THE DIGITAL AGE:

AN OPPORTUNITY FOR COOPERATION FOR UNESCO IN LATIN AMERICA AND THE CARIBBEAN

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The Economic and Social Council (ECOSOC) serves as the central forum for discussing international economic and social issues, and for formulating policy recommendations. Global preparatory meetings, regional consultations and national reviews are essential to prepare the Annual Ministerial Review and Development Cooperation Forum, which ensures a comprehensive, qualitative review of progress in implementing the MDGs.

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Prepared by the Regional Bureau of Education for Latin America and the Caribbean (OREALC/UNESCO Santiago).

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FOREWORD

The Latin America and the Caribbean region has made monumental efforts to incorporate Information and Communications Technology (ICT) as part of national education systems. Countries are considering strategies as varied as equipping educational establishments with digital infrastructure, connecting schools to Internet, incorporating computerized school management systems, revising national curriculum (incorporating new, higher order digital competencies) or a combination of all of these strategies.

A decade ago, the region began to substantially increase its investment in hardware and training of students and in-service g teachers, initiatives - that focused on classroom teachers and school management staff. In quantitative terms, this led to modification of the equipment availability indicator, shifting in the last six years from "computers per school" to "computers per student." In the region's most developed countries, this indicator has attained rates approaching 10 students per computer. More significantly, Uruguay, certain rural zones of Peru and pilot cities of Brazil have embarked on models of one laptop per student.

This issue is so widespread that it cannot go unnoticed by officials or agencies with some measure of responsibility in education in the 21st Century.

However, no consensus exists yet in regards to the impact of digital technology on student learning. A significant number of experts insist that the new technology improves the learning environment. They say it creates a more effective setting, motivates students and even contributes to the development of what have been termed fundamental 21st Century skills (21st Century Skills, 2002). When the technologies are adequately integrated, evidence suggests positive effects can result in the sciences as well (Cox.et.al, 2003; Harrison et.al. 2002). Drawing on PISA 2006 data, the Economic Commission for Latin America and the Caribbean (ECLAC, 2011) identifies a degree of positive association between the type of technological use and the performance of secondary school students in the area of the sciences, in Uruguay, Colombia and Chile. Another group of experts, no less important, argue that the evidence available so far is insufficient to assert that digital technologies have any effect on education quality (Cuban, 2001).

Considering the lack of clarity even as to which indicators are relevant, the debate which has grown in recent years is likely to persist before amassing evidence and building agreements on the issue of the impact. Meanwhile, digital technologies in all their different formats do not cease to invade schools, classrooms, and the different spaces in which students spend their lives. Clearly, digital technology is here to stay.

Given the inevitability of this "invasion," certain fundamental questions ensue, pressing for answers, even while the debate persists: How can we harness technologies to improve education quality through public policy in education that includes or fully incorporates digital agendas? And, how can we employ these policies to improve the processes that shape education quality? This leads us to the core question: how can these technologies increase pedagogical process productivity in the classrooms?

This document – drafted jointly by the UNESCO Regional Office for Education in Latin America and the Caribbean (OREALC) and UNESCO's Office in Brasilia (hereinafter, UNESCO LAC) - hopes to contribute to the current discussion and search

for answers to the questions noted above. Indeed, UNESCO LAC has spent a good while considering its own contribution to ICT for education quality in the 21st century regionally, both on the national and regional levels. Notable examples are the analysis by Teresa Lugo of IIPE in Buenos Aires (Lugo: 2010) and the International Seminar "Impacto de las TIC en la Educación" ("Impact of ICTs on Education") held in Brasilia (UNESCO-LAC, 2010). That seminar, convened by the UNESCO Offices of Santiago and Brazil in April 2010 in conjunction with the Brazilian Government, reached the following conclusion:

"Questions about incorporation of ICT in the schools do not refer to the greater or diminished effectiveness these have shown thus far as learning tools; instead, they ask how, in what way, the digital revolution and its effects on productivity can be incorporated as part of the work that goes on in the classroom and the school." (Schalk, 2010) (The underscoring is ours.)

After the seminar, commissions from both UNESCO offices have continued to encourage reflection regionally with a wide range of groups, including some of the leading firms of the technology sector. Consequently, the document that follows is a synthesis of the major ideas that emerged in the different discussion forums in which UNESCO has participated. In this paper we propose a regional action framework on the issue of ICT inclusion in education. Input from everyone who wishes to contribute to the debate will enrich this document.

For this purpose, an online discussion forum will be set up. Please visit www.unesco.org/santiago for more information or contact us at Santiago@unesco.org.

INTRODUCTION

This document presents proposals for collaboration in the area of digital education policy from UNESCO's two offices in Latin America: the Regional Office for Education in Latin America and the Caribbean (UNESCO OREALC) and UNESCO Brasilia. Over a year ago, UNESCO staff of both offices, with support from consultant Mr. Didier de Saint Pierre, together with other institutions and people, began developing recommendations intended to give greater visibility to the major problems school systems face in the full and effective utilization of digital technology in the classroom. These have become UNESCO's proposals for collaboration in the region.

Thus, in section 1, this paper describes the context of technological change globally, and how this affects students, educators, and school systems. It will describe a territory, an instance for social, technical, and political practice, known as "information technology in education," which requires public policy to support achievement of quality education.

In section 2, the document presents a synthesis of the various IE proposals undertaken in specific program and projects in the Region. The section concludes with a description of the essential components of Information Technology in Education (ITE) policy, lessons learned, and, in section 3, highlights UNESCO's proposals at the global level and proposals for implementation in Latin America and the Caribbean, as opportunities to collaborate to achieve quality education for all in the region.

It is important to note that this is an advance version of the discussion paper and, given our interest in encouraging input from various stakeholders and partners, this paper should be considered a work in progress.

I. CONTEXT

Education has been regarded, for a long time, as the foremost link that articulates cultural integration, social mobility and productive development. A broad consensus exists today that education is that "great link," however, and despite efforts exerted in recent decades, Latin America's education systems continue to face significant structural problems that hampers expansion of quality education in all countries of the region. Nearly 50% of Latin America's population between 5 and 19 years of age, which ECLAC estimated at more than 150 million in 2005, are excluded from formal educational systems, with access only to schooling so inadequate that full integration in the modern economy is not possible and even puts them at risk of belonging to those segments of the population that remain below the poverty line (ECLAC).

Moreover, education models and curriculum contents have come under fire. In fact, these systems were designed to meet the demands of a society quite different from today's knowledge societies. The sweeping changes contemporary societies have experienced place in doubt what should be taught and how students should learn.

1.1 The digital revolution

We live in times of tremendous technological transformations that profoundly alter human relations. Access and the generation of knowledge have become the driving forces behind development. The modes of connectivity are at the heart of processes of change in the economic, political, and cultural spheres, which have given way to what is known as "globalization." People become involved in new forms of participation, social control and activism through social networks[1]. The network-based participation enriches democracies, comprising a new world order accentuated by the emergence of cyber citizenship, with far greater force than conventional citizenship ever had. The imprint of digital technology is felt in every area of social activity, and joins forces with the changes that have taken place in the workplace, family and education, among others. This prompts the question: are school systems preparing children for such changes or are they merely passive receptors of the effects of change?

1.2 Learners of the new millennium

Parallel to the situation described above or possibly as a result of it, the new generations experience digital technology intensely, to such an extent that it appears to alter their cognitive skills. Indeed, these young people have not known a world without Internet; for them, digital technology has shaped a major portion of their life experience. They are developing different skills and habits: they acquire vast amounts of information outside of school, they are quick to make decisions, they are used to receiving responses to their actions almost instantaneously, they have a surprising capacity for parallel processing, they are highly proficient in multimedia and they appear to have a different way of learning (OECD-CERI, 2006). Such changes pose other questions. Specifically, are current pedagogical models useful in motivating learning? How can schools "capitalize" on the capacities and abilities of these new learners?

1.3 New roles in the school systems

The trends described above exert immense pressure upon school systems, which struggle to adapt to the

1 There is evidence that these were decisive in events that occurred in 2011 the Middle East and North Africa. Also, the role it played in Chile's mass student mobilization, known as the "revolution of the penguins" of 2006, is well-documented.

changes that originate in other social spheres. In addition, schools encounter the need to introduce innovative pedagogical methods if they wish to convene and inspire the new generations of young people, known as "digital natives" (Prensky, 2001).

In this context, school systems face the need for mayor and unavoidable transformation to evolve from education that served an industrial society to one that prepares children to be full actors in the knowledge society. Students, girls as well as boys, must be prepared to perform in work that does not even exist today and they must learn to constantly update their knowledge and skills, and acquire new competencies consistent with this new order: information management skills, communications, problem resolution, critical thinking, creativity, innovation, autonomy, collaboration, team work, among others (21st Century Skills, 2002).

This transformation is not easy, however. Schools - traditionally institutions designated to preserve and transmit previously established practices, customs, knowledge, abilities, and values – design activities and work at a pace that are out of step with the temperament and characteristics of the "digital natives." Schools develop activities that demand long periods of concentration, with attention focused on one activity at a time. They expect such activities to foster "thinking" or "reflection" among students, and that they will read and produce texts printed on paper. Schools expect students to learn this way, but, they confront new practices from students who are accustomed to:

I.I. Access digitalized information, not printed on paper.

II. Enjoy images in motion and music, rather than text.

III. Feel comfortable performing multi-tasks simultaneously.

IV. Obtain knowledge by processing discontinuous, not lineal, information.

The introduction of ICT in the classroom underscores the need for new definitions of roles, especially, for students and teachers. Thanks to the new ICT tools, students may acquire greater autonomy and responsibility in the learning process, compelling the teacher to depart from the classic role as the sole source of knowledge. Considering that mastery of ICT skills did not form (and still do not) part of teachers' standard skills, the perception even exists that students are ahead of teachers in this subject. This generates uncertainty, tension and fear; the reality calls for a creative reformulation of the school as institution (Lugo, 2008).

1.4 The digital information territory

The questions and developments outlined above must generate new education distinctions and practices through technology geared for a digital world. We shall call this field of distinctions and practices "Information technology in education."

Information technology in education focuses on schools, not one school in the singular, nor the exceptional school in which some innovative project is in motion, unfolding under ideal laboratory-like conditions. Rather, the focus of information technology in education is the network of schools that comprise the school system of a sizeable territorial unit (municipality, region, province, department or state and country), conducted under the conditions characteristic of that territory.

This paper strives to reach an understanding about how the new technologies affect school systems activity in areas such as the following:

- Curriculum management (how curriculum is organized, teaching planned, teachers' actions in the classroom, ICT integration in curriculum)
- Leadership (school management, directive planning, monitoring)
- Coexistence (free access and training of students, parents, computing portals to improve school/family communication
- Professional development of teachers (training, participation in specialized interest communities)

Information technology in education territory also addresses extraordinary educational possibilities that digital technologies make available (for example, the virtual school).

Although information technology in education is capable of addressing a limitless set of issues, this proposal presents in-depth study of two important information technologies in education proposals. The first involves the school as an *intensive organization for the production and consumption of a broad spectrum of information*, that ranges from the use of the physical, financial and human resources that comprise it, information about the students, their styles and learning progress, information about the teachers and their skills, information about learning outcomes, and also exchange of information with the environment, the community, government ministry structures, etc. Clearly, *a great challenge of information technology in education is to help process the flow of all this information, transforming it into relevant and timely knowledge for making good and well-founded decisions*. Few question this important contribution.

Another facet of information technology in education is its impact on ***the teaching and learning process.*** This terrain is the setting for the most contentious debates between those who associate it with "a major and unavoidable transformation of education systems, namely, to evolve from education that serves an industrial society to one that prepares youngsters for the knowledge society" (Jara, 2008), and who believe it is simply one more educational resource of a long list of existing resources available in the classroom. This component is source of the major tensions among those responsible for designing education public policy.

2. INFORMATION TECHNOLOGY IN EDUCATION PROPOSALS IN LATIN AMERICA AND THE CARIBBEAN

This chapter analyzes the major Information Technology in Education proposals (detailed in Appendix A), in order to generate a framework to enable: a) understanding the main factors that shape information technology in education policy; b) establishment of causality relationships between factors and c) the design of an instance for intervention.

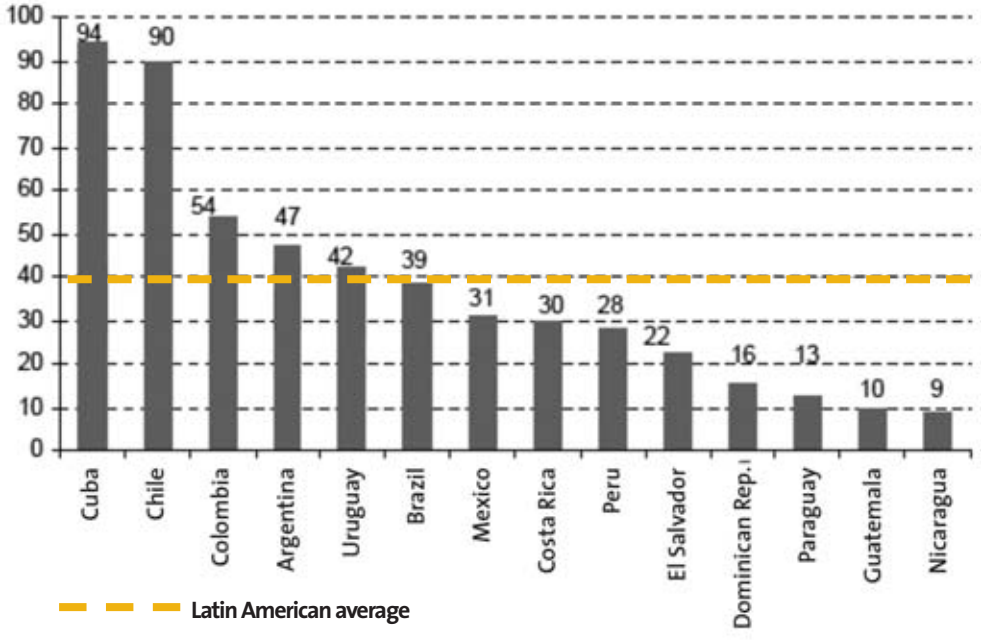
The analysis begins with a statement: **an information technology in education policy should have a clear, stated purpose that reflects the vision and expectations officials have regarding the role of ITCs in education**, and endows the various actions undertaken with a sense of cohesion. The purpose may change over time; however, the various strategies and actions must be aligned with the purpose in course at a given moment.

2.1 Analysis of ITE proposals in Latin America and the Caribbean

It is important, first of all, to point out that vast differences exist in the region's educational system coverage and in the technological infrastructure.

Such differences notwithstanding, this is a restive and active region in the development of information technology in education. This is evident in the **e-LAC2010** action plan, prominently promoted by ECLAC, which addresses the efforts Latin American governments have made to advance in the direction of information societies. The report signals more than 20 countries of the region that have identified ICT incorporation in education as top national priority.

PERCENTAGE OF PRIMARY SCHOOLS IN LATIN AMERICA AND THE CARIBBEAN WITH COMPUTER ROOMS (SELECTED COUNTRIES, YEAR 2006)



Source: ECLAC, working with data from SERCE, 2006
Note: Ecuador and Panama are not included because of a lack of valid information. The average is not pondered.

Data compiled on the issue indicate that achievement of most of the objectives described above hinges on pedagogically structured environments, produced from the convergence of a series of factors, especially, good curriculum management in the classroom and the school.

The following chart is a model of the evolution of strategies most countries have followed in their efforts to incorporate ICT in school systems. The model describes the leading characteristics of each stage of the seven components that comprise the framework for the policy: technology, connectivity, teaching skills, pedagogical methods or models, the impact on the curriculum, new digital and institutional educational resources. The issue of environmental structure is cited indirectly and partially in the columns titled "Improving curricular learning" and transformation of educational models."

Tabla 1: Evolution of ICT incorporation in school systems

Stage/purpose **Components**	**Steering, understanding the phenomenon**	**Closing the digital gap between students and teachers: lab, staff room**	**Improving curriculum learning: ICT in the classroom; evaluation and management**	**Transforming educational models: Models 1:1**	**Continuing education, at any place, at any time: e-learning**
Technology	Few PCs in the school >50:1	PCs in computer lab, rates vary from 20:1 to 10:1	ICT enters the classroom: projectors, interactive chalkboards; management software	Laptops 1:1	Computer at home
Connectivity	Telephone connection	Internet in the computer lab, by cable	Wireless connectivity in some classrooms	High-speed Broadband and school set up with WiFi	Broadband at home
Digital Curriculum		Focus on digital literacy of teachers and students.	Intermediate ICT curriculum integration	Complete ICT curriculum integration	Digitalized and online curriculum; online evaluations
Uses: Teaching methods		Individual or in small groups use of available computers	Teaching based on projects; interactivity	Collaborative, personalized student-centered teaching	Student-centered distance learning
Digital teaching skills		Only coordinator in lab	Classroom teachers: intensive training	More teachers, more complex; development of specific skills	Tutors

Digital Educational Resources		Personal productivity tools; simple educational	Chalkboard Software; simulators; multimedia learning objects	Software 1:1; online learning assessments; video games	Digitalized online curriculum
ITE institutional base	Foundation, grant, or program	Foundation, grant, or program	Specialized center, or Education Ministry unit	Specialized center, or Education Ministry unit	Specialized center, or Education Ministry unit

Clearly, Information Technology in Education proposals increasingly encompass all areas of school life and school system activities. However, with some exceptions, the development has not taken place in a consistent, persistent or structured fashion. The sheer variety of projects underway in school systems of Latin America and the Caribbean make the region an excellent laboratory, as long as lessons can be culled from these experiences.

From this standpoint, lessons for policy development are presented below.

2.2 Components of CE Policy in Latin America

The design of Information Technology in Education policy demands a systemic perspective that includes the coordinated and concerted development of different lines of action, in order to create the conditions to achieve the desired objectives. In this case, the framework we propose identifies a minimum set of components that must not be overlooked:

- Technology or Infrastructure component. This refers to the equipment and connectivity that must be placed in the schools to meet policy objectives. It also involves management, technical support, and maintenance/repair policies to ensure continuity of equipment operation and availability.

- Digital Skills and Managerial Leadership component. This refers to providing trained teaching staff and administrative leadership in digital terms, in keeping with policy needs. It ranges from simple digital literacy to development of sophisticated pedagogical skills, and/or ICT management. This is a key issue, as teachers are responsible for vesting the technology placed in the schools with an educational intent; otherwise, infrastructure will have little effect on learning. UNESCO has developed a set of standards for teacher digital competency [2] (See Chapter 6).

- Educational Digital Resources Component. This refers to all elements of content (digital texts, educational software, learning tools, simulators, social networks etc....) that, when coordinated with curriculum, foster an educational use of infrastructure. UNESCO encourages the building of a global library of digital resources open and free for classroom use. [3] (See Chapter 6).

2 ICT Compentency Framework for Teachers or ICT-CFT, whose purpose is to define the competencies teachers need in order to use digital technology in their pedagogical practices.

3 Global Courseware Digital Library or GCDL, digital library of educational resources for teachers and students, inspired by iTunes.

- Pedagogical uses and models component. This refers to the diverse educational uses of ICT that range from traditional uses to new pedagogical models such as those based on the Innovative Teaching Practices approach that apply the five learning components of the 21st century: collaboration; knowledge-building; use of ICTs for learning; problem resolution and innovation, and self regulations, which we mentioned earlier. (ITL, 2010).

- Curriculum Component: This refers to curriculum changes that enable incorporation of the sophisticated digital skills knowledge societies require while also addressing the new ethical dilemmas that arise in the virtual world (e.g.: cyber bullying, information privacy, "hacking" etc.)

- Assessment Component: This refers to the measurement of results and outcomes of each policy component, in coordination with assessment systems developed by Education Ministries. UNESCO has contributed to the development of a set of standard, comparable, reliable and relevant indicators for monitoring the process of Information technology in education development. (See Chapter 6)

In addition, policy implementation requires an **adequate institutional base**, endowed with the resources and authority to direct the process.

Lastly, a series of environmental factors are essential when it comes to designing strategies and policies. These call for coordination and articulation with other actors, not necessarily from the world of education. These include the following:

- Existence of human capital to carry out the policy challenges. This refers to the existence of adequately trained professionals to assist in developing and implementing policy, for example, a number of professional staff with postgraduate degree in Information Technology in Education.

- Condition of Initial Teaching Staff Training. This realm, which generally comes under an institutional base that governs higher education, is immensely pertinent. It is in this instance where future teachers are trained, and where reflection and research is conducted on new didactic methods that employ ICT.

- Condition of the country's infrastructure and connectivity.

- Development of local industry of contents.

- Political commitment backed up by financial resources.

- Incentives policy.

- Resistance, barriers of some special interest groups (e.g., teachers' unions or professional societies).

From the perspective of pedagogy, the incorporation of ICT in the classrooms in a way that has a real impact on learning requires the conjugation of all these points to make way for daily lessons in which ICT is employed to boost teaching staff productivity, while also contributing to the development of new teacher and student skills.

2.3 Lessons learned

1. The first lesson is that it is one thing to implement an educational computer program and quite another to forge information technology in education policy. This confusion can provoke great

frustration when programs lack a systemic vision and have a limited existence in terms of time, arising as the product of the enthusiasm of certain promoters, only to die when the enthusiasm ebbs or when the promoters cease to exist. One attribute of such policy must be the creation of conditions that render it sustainable over time.

2. It is also important to point out that an information technology in education policy designed from the digital agenda is not the same thing as one designed from an education policy umbrella. The incorporation of technological infrastructure in the schools alone will not change the learning process, nor is it even guaranteed to help narrow the digital gap, as the absence of clear policy risks creating new gaps. To have an impact on learning, the pedagogical focus must rise from educational policy and confer ICT incorporation in the schools with meaning.

3. A certain degree of agreement exists regarding the notion that effective schools or those that can boast of outstanding achievements – without technology – share a series of characteristics. These include managerial leadership, targeted learning, teachers' high expectations; the relevancy of classes for students of the specific school communities, a mutually reinforcing evaluation system for teaching staff; the commitment from parents and the community, and a peaceful school setting (Bellei and others: 2003; Murillo, Javier: 2005)[4]. While digital technology can decisively contribute in the presence of each of these factors, it is no less true that it is problematic to isolate the effect of using digital resources in schools with well-structured pedagogical models, in which the digital component is part of a greater set of resources. In short, the world's best state of the art technology, on its own, will not improve learning in ineffectual schools lacking structured pedagogical structures.

4. In this context, the teacher's role is key. Throughout the region, training of working teachers continues to focus primarily on digital literacy. Some countries, although still very few, are moving on to a more advanced stage that consists of teaching them how to make use of technology in educational contexts to design different pedagogical activities with technological support, in an effort to restructure the whole body of teachers' knowledge, and prepare them for new methodological approaches to the teaching and assessment processes. The re-design of Initial Teacher Training (ITT) is probably one of the most pressing issues, yet the region's countries continue to neglect this critical factor. Educator training centers definitely remain anchored in traditional views of teaching.

5. From the perspective of content, several of the region's countries have undertaken initiatives to develop Learning Objects or similar things. Yet, the exchange of resources between countries is practically nonexistent despite the existence of mechanisms for that purpose. Not a single country is capable of building a digital resource base that can be called "new generation curriculum." For this reason, it is important to promote collaboration.

6. Finally, analysis of the different experiences of the region's countries leads one to conclude that while each experience is differs from the rest, the repetition of certain patterns supports the presumption that the countries continue to evolve in the development of their information technology in education policies or programs, a process that is comprised of stages of ever-increasing sophistication. Commonly, countries

4 Bellei and others: 2003. ¿Quién dijo que no se puede? Escuelas Efectivas en Sectores de Pobreza. UNICEF/Chile. Ministry of Education, Santiago, Chile Murillo, F. Javier: 2005. La Investigación en Eficacia Escolar y Mejora de la Escuela como Motor para el Incremento de la Calidad Educativa en Iberoamérica. REICE.Revista Electrónica Iberoamericana sobre Calidad, eficacia y Cambio en la Educación año/volumen 3 No. 003. En: http://redalyc.uaemex.mx/pdf/551/55103201.pdf

begin with timid trial programs that implement pilot projects enable officials to learn and then evaluate the outcome. Subsequently, countries enter a period marked by substantial investment in infrastructure and digital literacy, after which emerge the initial efforts to link this infrastructure and teaching skills with improvements in learning. At some point in time, the intuition emerges that technologies are a wellspring of transformation and exploration ensues for new educational models based on the possibilities the new technologies offer. In the course of this process, increasingly sophisticated and ambitious usages of ICT are incorporated. Maturity is a gradual process. While skipping stages and taking shortcuts may bring risks, it is not necessarily synonymous of failure.

3. UNESCO'S VISION ON THE ROLE OF ICT IN EDUCATION

3.1 General vision

UNESCO defines its ICT in education principles (UNESCO, 2009) in the following way:

I World challenges in education, especially the Education for All (EFA) objectives will be very difficult to reach using traditional education mechanisms, particularly in developing countries. UNESCO believes ICT can have a tremendous impact on the expansion of learning opportunities to a far greater and more diverse population, outside the boundaries of educational institutions and has the capability of crossing geographic barriers. UNESCO believes technologies can improve teaching/learning by reformulating conventional systems that provide this, by increasing the quality of learning achievements, facilitating training that targets the development of skills demanded by the information society, and sustaining lifelong learning.

II Old and new technologies must be employed in a balanced fashion. Radio, television and video equipment without digital connection are still considered valid and cost-effective technologies, as valid as computers, Internet connection or distance education.

III Fulfillment of the international education goals set for the year 2015 will require vast investments in teacher training. According to experts, conventional training models are incapable of addressing this serious challenge. The common need to adapt school programs also requires major training of teaching staff. In this domain, ICT support is critical.

IV Demands for better higher education cannot be met (in neither industrialized nor developing countries) without distance or virtual learning education models.

V Vocational training needs cannot be met without virtual classes, virtual laboratories, etc.

UNESCO has thought about and developed Information Technology in Education actions a long time. Landmarks include the development of an ICT teacher competency framework[5] (UNESCO 2008), the drafting of policies and building a global library of free digital resources for the classroom[6] and propelling the development of standardized, comparable, and relevant indicators to monitor the process of development of Information technology in education[7] (UNESCO, 2009).

Recently, UNESCO's General Director commissioned an assessment study of the main lines of action UNESCO is carrying out in this area, for the purpose of:

a) Reviewing the different initiatives undertaken by UNESCO, particularly, ICT-CFT and GCDL.

b) Studying how such endeavors can coordinate better with other UNESCO initiatives.

c) Formulating recommendations to guide UNESCO's future actions in this area (UNESCO, 2011) which were recently announced, and can be summarized as follows:

5 ICT Competency Framework for Teachers or ICT-CFT for the purpose of defining what competencies teachers need in order to make use of digital technology in their pedagogical practices.

6 Global Courseware Digital Library or GCDL, digital library of educational resources for teachers and students inspired in iTunes.

7 In 2004 the UNESCO Institute for Statistics (UIS), together with Eurostat, ITU, OECD, UNCTAD, UNDESA, the regional United Nations commissions (UNECLAC, UNESCWA, UNESCAP and UNECA) y el Banco Mundial, formed the "Partnership on Measuring ICT for Development" that developed a base of indicators for monitoring ICT and education policy development.

1. Publish the 2.0 version of ICT-CFT that includes practical examples of how to employ it.

2. Commit support from member countries to adapt the ICT-CFT framework to their specific national contexts.

3. Abstain from any ICT-CFT certification process.

4. Continue with implementation of pilot programs in various countries through use of the digital Resource Library.

5. Articulate these initiatives with other UNESCO initiatives such as:

- **a.** "Teacher Training Activity"
- **b.** "Open Educational Resources" (OER)
- **c.** Free and Open Source Software (FOSS) for Education

The directives recommended for UNESCO's future actions in this domain are:

I To position UNESCO as a world agency leader in ICT and education, contributing to the global debate on the role of digital technology in the transforming education and analysis of future trends.

II To foster free access to quality tools and resources that reflects the countries' priorities.

III To strengthen national and institutional capabilities by supporting member countries that demands it..

IV To promote cooperation with the private sector.

3.2 UNESCO, Information Technology in Education, Latin America and the Caribbean

In Latin America and the Caribbean, the concern is latent. During a recent meeting of the Board of the Intergovernmental Committee of the Regional Education Project for Latin America and the Caribbean[8], representatives of the regional educational systems expressed many concerns directly or indirectly related to the phenomenon described earlier in this paper:

- Board members emphasized the concern for youth and school dropout, affirming that the school dropout phenomenon not only stems from the student's social and economic situation but also from **lack of motivation for an offering that is irrelevant to their lives.**

- The Board stressed the need to prioritize equity policy, considering that **inequality remains the region's overriding problem.**

- Teachers' initial training and service was highlighted as an issue that remains critical regionally. Board members suggested **the need to review in depth the current approaches and their adequacy to new demands of the social and cultural context.**

- The meeting signaled the importance of introducing greater flexibility and efficiency in the use of education resources and to improve accountability. Participants **suggested that countries share practices that have yielded the best results.**

Board members also discussed the use of new computer and communication technology in

8 First Meeting of the Regional Intergovernmental Education Project for Latin America and the Caribbean -EPT/PRELAC

education and suggested incorporating this issue as part of the EFA/PRELAC agenda. In this regard, they emphasized **the need to train teachers so that students, in turn, may receive adequate training, enabling them to traverse towards a solid "know-how" in this area. The proposal was made to expand ICT-based strategies, taking care not to fall into a fashion devoid of content,** taking responsibility for the developments needed for pedagogical use and analyzing the true costs technological equipment represent for schools so as to avoid creating false expectations. Participants suggested **analyzing the possibility of building a virtual regional platform managed by OREALC/UNESCO Santiago**, co financed by countries of the region, that would offer accessible pedagogical resources both for students as well as teachers and the general public, which would store trustworthy links and systematize information categorized on the issue. **They also urged the development of an intervention strategy to respond to the matter of digital and communications technologies in education, ICT as an emergent and key issue.**

In April 2010, UNESCO Offices of Santiago and Brazil, in conjunction with the Brazilian government, organized an International Seminar on the "Impact of ICT in Learning Achievement," in the city of Brasilia (UNESCO-LAC, 2010).

As described earlier, one of the main conclusions signals:

"Questions about ICT inclusion in schools do not refer to the greater or lesser efficacy these have demonstrated as learning tools; rather, their focus has been on how the digital revolution and its effects in terms of productivity can be incorporated into the classroom and the school.

"Equipment-product models as the focus of analysis of ICT results and impact in the schools are inadequate. Equipment-process-product models that underscore process have a better capacity to elucidate the phenomenon's complexity. Indeed , ICT integration in formal education is achieved through education management policy; ICT management processes in educational institutions and curriculum management processes in schools and in the classroom ..." (Schalk: 2010)[9]

The seminar concluded with a strategic analysis meeting between representatives of UNESCO and collaborative institutions such the Inter American Development Bank and Microsoft, Cisco, and Dell companies. At that meeting:

- Participants reaffirmed that the guiding principle of ICT incorporation in the school and classroom originates from the fact that digitalization of the majority of human activities is an indisputable and irreversible process and that digital tools substantially contribute to increased productivity and generation and dissemination of scientific and technical knowledge.

- The meeting ascertained that many Latin American students make use of these technologies for recreational and communicational purposes; therefore, educational institutions of all different levels, grades and formats have a broad margin for obtaining significant benefits by incorporating digital technology in pedagogical processes, as well as administrative and community relations processes.

- Participants agreed that the greatest challenge for UNESCO-LAC and its strategic partners is to expand digital technologies universally

9 Schalk, Ana 2010: El Impacto de las TIC en la Educación. Relatoría de la Conferencia Internacional de Brasilia. OREALC/UNESCO Santiago, 2011. En: http://unesdoc.unesco.org/images/0019/001905/190555s.pdf

as an optimum medium for transforming administrative and pedagogical practice much more than hundreds of schools in the region. They also concur that inadequacies in achieving the objective of quality education for all, especially in lower income populations, are evident.

Meeting participants agreed to expand the following five potential lines of action:

1. To strengthen curriculum management capacities and development as well as usage of digital applications and content that foster learning among all students, without distinctions. Possible programs suggested were: a) Leadership and management training in classroom and school learning to foster the use of ICT as a means for planning, scheduling, implementing and evaluating the capacity of classes to motivate students and B) Development of applications specifically designed to overcome inequities and attain the Millennium Development Goals, particularly in regards to illiteracy.

2. Assessment of ICT impact. UNESCO has commissioned numerous impact assessment studies of ICT use in a range of programs worldwide. In addition, the Montreal-based UNESCO Institute for Statistics (UIS) is preparing a series of ICT management and use indicators from the perspective of the information society. Likewise, the UNESCO Bangkok office is developing a long-term program of achievement indicators for innovative projects that use ICT[10]. Moreover, the UNESCO Brasilia Office developed ICT in education assessment methodology for government programs and private sector projects currently in practice in Brazil.

3. Support for the ICT Integral Design Policies geared to learning achievement regionally[11]. The Program's objective will be to foster integral ICT policy designed for learning achievement in and from the classroom.

4. Teacher training (initial and in-service). The conference emphasized the importance of pedagogic use of ICT. For this to take effect, provision of equipment and connectivity must be accompanied by highly skilled teaching staff capable of creating, managing, and articulating learning situations in which the technological component is a decisive added value[12]. Two spheres of action were defined:

a. Initial Teacher Training that features the principle of example in teacher training, expressed in the phrase "the way we learn is the way we teach;" in this sense, if one of the central policy objectives of the coming years is to fully incorporate ICT in the classroom, then the requirements described earlier for schools are also indispensable requirements for training teachers themselves. .

b. Training of in-service teachers, in which the key aspect is to show that ICT use enables them to respond to the various different speeds, paces, and styles of learning students have.

10 Performance Indicators on ICT Use in Education project UNESCO Bangkok Office: http://www.unescobkk.org/education/ict/ict-in-education-projects/monitoring-and-measuring-change/performance-indicators-on-ict-use-in-education-project/

11 Few countries in the region have long-term, integral national information technology education policies (De Saint Pierre, 2010), (CEPAL 2011). The landscape looks more like a field planted with projects that develop as the expression of seasonal enthusiasm only to decay or die in the wake of new source of enthusiasm.

12 Guzman and Nussbaum identify six domains that strengthen ICT classroom integration: "instrumental/technological, pedagogical/curricular, didactic/methodological, evaluative/investigative, communicational/relational and personal/attitudinal," See: "Teaching competencies for technology integration in the classroom", in: Journal of Computer Assisted Learning, Volume 25, Number 5, October 2009 , pp. 453-469(17)

5. *Clearinghouse:* In finance, a *Clearinghouse* is the entity responsible for liquidating operations between participants or members. It becomes the purchaser of all its selling members and the seller of all its purchasing members. In this area, the role of *clearinghouse* refers to enabling all UNESCO member countries to share information, statistics, knowledge, and good practices, appraised as relevant for the development of information technology in education. An ICT *clearinghouse* also offers mechanisms for intelligent management of these elements. It brings countries together in a network, in the dual role of producers and consumers of information and knowledge.

4. LINES OF ACTION PROPOSED FOR UNESCO IN LATIN AMERICA AND THE CARIBBEAN

The proposals that best integrate UNESCO's strengths in Latin America and the Caribbean within the regional context comprise lines of action in which the Organization can make significant contributions. These are:

1. Support for formulation of Information Technology in Education Policy in the region. This line of action draws from UNESCO's legitimacy and the confidence regional *policymakers* have in its proposals. UNESCO should point out to regional decision-makers (ministry, government, congressmen, *stakeholders*, etc.) the need to approach information technology in education as a substantial aspect of education policy, with long-term objectives and strategies and instruments for evaluating progress. The means could vary from high-level consultancy for governments, installation of these issues at conferences and seminars and/or designing a diploma course to train policymakers. The first step should be a state of the art diagnosis of public policy proposals and practices in the region aiming for ICT incorporation in education.

State of the Art: Many countries of the region continue to confuse projects of limited scope with policy. Countries pursue heterogeneous proposals: most have passed the exploratory stage (pilot programs), some continue to focus on closing the digital gap but most countries work in the area of ICT curriculum integration as an objective or central motivation of their ITE policy. Some countries have even begun to explore experiences of education practice transformation, but still with pilot programs lacking conclusive results. This does not mean that former stages are complete or that access gaps have closed. In fact, many years will pass before this occurs in the region. Nevertheless, the focus of ITE policy is no longer on access. Gradually ITE policy has transferred to Education Ministry agendas, which have acquired a growing protagonism in its development.

MAIN TARGET GROUP:
Policymakers, Ministry decision-makers, local, regional or national government officials.

RESULTS EXPECTED:
- Training of *policymakers*
- Existence of information technology in education policy (that qualify as such) within education policies of the region's countries/states

RESULTS/IMPACT INDICATORS:
- Existence of a training program (diploma course) for *policymakers* in the region, focused on the design and implementation of information technology in education policy Coverage: at least x% of regional countries with stated IE policy
  Scope: Areas addressed by policy
- Budget: % of education budget allocated for ITE

ASSESSMENT METHODOLOGIES:
- Number of students (*policymakers*) graduated from diploma courses
- Surveys conducted on countries' ITE policy, with means of verification (documented policy)
- In depth analysis of policies
- Analysis of education budgets

2. Fostering ICT incorporation processes and digital resources in pedagogical processes as part of policy implementation.

State of the art: Evidence exists of implementation of Innovative Teaching Practices applications of the five components of 21st Century learning (collaboration; knowledge-building; ICT usage for learning; problem resolution, innovation and self-regulation) improves student learning as a whole (ITL Research, 2010). Such practices result from national and local educational policy that include ICT; teachers who master ICT usage standards, and also *specific changes and support at the school level*. Consequently, the 21st Century learning approach must be fostered from *daily class planning, scheduling and curriculum management* in schools.

MAIN TARGET GROUP:
School network administrators; student readers, computer support staff at intermediate and school levels.

RESULTS EXPECTED:
- An increasing number of schools implement the 21st Century learning focus and through that means, incorporate ICT and digital resources usage.

RESULTS/IMPACT INDICATORS:
- Number of schools that include 21st Century learning focus in daily class planning, scheduling and curriculum management.

ASSESSMENT METHODOLOGIES:
- Review class plans, review curriculum scheduling at school level and complementary materials in schools, classroom visits and class ethnography.

3. Support for regional teacher training processes. This line of action is based on UNESCO development in this domain (UNESCO standards for teacher training in ICT-CFT) and is open to different possibilities: a) policy recommendations on teacher digital training (for initial training and teachers in practice) and teacher incentive policies; b) adaptation and dissemination of ICT-CFT standards for various teacher training programs and the contexts of regional countries and c) implementation (in conjunction with partners) of courses or curriculum implementation guidelines for teacher training that incorporate skills proposed by UNESCO.

State of the Art: In the region, training of in-service teachers primarily focuses on digital literacy. Only a few pilot projects seek cognitive restructuring of the entire body of teacher knowledge, and the new ways of methodologically addressing the teaching and evaluation processes. In regards to characteristics of the teacher training, participants emphasized the following strategies:

- Traditional (lectures and in person)
- Based on projects (IntelEducar type)
- Distance (e-learning)
- Cascade model (trained teachers with special aptitude train their peers)

Initial Teacher Training is one of the most neglected issues in the region. Policy in this area is notably absent.

Few regional countries have ICT competency standards, teacher assessment procedures consistent with those standards, or competency certification processes.
Lastly, no country of the region has reported the existence of any type of incentive as recognition of the use of computer resources in the educational environment.

MAIN TARGET GROUP:
Teacher training (initial and in-service) institutions, Education Ministry higher education departments.

RESULTS EXPECTED:
Incorporation of "digital teaching skills" in university curriculum guidelines as well as curriculum guidelines of initial training institutions and programs that train practicing teachers, as a result of Education Ministry policies or the adoption of good practices by these institutions.

RESULTS/IMPACT INDICATORS:
- % practicing teachers with basic/advances digital skills.
- % teacher graduates with basic/advanced digital skills.
- % FID institutions develop digital skills as part of their curriculum guidelines.

ASSESSMENT METHODOLOGIES:
- Online surveys conducted of a sample of universities and training institutions.
- Online testing to assess teacher competencies applied to a sampling of graduates and practicing teachers

4. Observatory on Evaluation of ICT Impact on Education. This line of action draws from work the UNESCO Institute for Statistics (UIS) has conducted in the area of indicators of ICT results and impact on education. In Latin America, it is feasible to propose the creation of a Regional Observatory for Analysis and Dissemination of Evaluations of ICT Use and Impact on Education that would foster, discuss, and monitor the different assessments conducted in the region for use in developing new projects and programs in countries. This line of action could even develop new assessment methodologies that encompass more than ICT impact on learning (for example, assessment of 21st century skills).

State of the art: A major problem in studying ITE policy in the region is the lack of standardized and comparable indicators. The region needs to implement indicators capable of taking into account the process of ICT incorporation in education (e.g., ITU proposals made through UNESCO) and keep an updated record of the progress that occurs in ICT policy implementation in each country. One of the major problems to be dealt with is the diversity of sources and references that compile incomplete and non-standardized data.

MAIN TARGET GROUP:
Education Ministries and officials; information technology in education officials, learning centers, study centers

RESULTS EXPECTED:
- Set of agreed upon indicators to evaluate IE development regionally.
- Evaluation (comparative) of the results and impact of the countries' IE policies.

RESULTS/IMPACT INDICATORS:
- Coverage: Number of countries with available and comparative indicators.
- Impact: comparative studies on policy effectiveness.
- Impact: suggestions for policies designed on the basis of indicators

ASSESSMENT METHODOLOGIES:
- Online surveys of government/IE institutional base.
- Comprehensive studies.

5. *Clearinghouse:* An UNESCO Knowledge Management department could be created to monitor the process and disseminate information about information technology in education activities and projects. This would include sharing a) educational digital resources (by locating digital resources of *Global Courseware Digital Library*, GCDL, initiative); b) announcing bids; c) good practices; d) Policy/project recommendations with their respective evaluations and any other element worthy of sharing regionally. Exchanging experiences, monitoring and evaluation is fundamental to enable regional countries to build upon the foundation of previous experiences so as to avoid committing the same mistakes others made in the past.

State of the art: Countries cannot capitalize on the wealth of experiences in the region unless these are recorded, systematized and shared. Consequently, many countries repeat the same mistakes or invest in very similar studies whose results are not made known. Good and bad practices and instruments such as terms of reference for successful concessions or record systems or learning objects are jealously guarded under lock and key instead of sharing them with others.

MAIN TARGET GROUP:
Education Ministries and officials, Information technology in education officials.

RESULTS EXPECTED:
- Knowledge database to facilitate regional policy implementation.
- Network of experts who countries may consult.

RESULTS/IMPACT INDICATORS:
- Number of documented and systematized experiences available for consultation by others.
- Impact: rate of consultations.

ASSESSMENT METHODOLOGIES:
- Online surveys on BD use.
- Download count.

These type of contributions offer an opportunity for UNESCO cooperation with national and subnational governments, private organizations that run school networks; with universities that educate or provide continuing education for teachers (initial training or in practice); with NGOs or other academic agencies that work or conduct research in this field; and with education sector companies that foster the use of technology in schools and innovative teachers.

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APPENDIX

In the interest of providing an overview of regional initiatives, this document analyzed the major ITE strategies and/or projects underway from 2005 to 2010, with the exception of Costa Rica, which has a wealth of experience dating back to the 1980s.

The Ceibal Project in Uruguay (CEIBAL: Conectividad Educativa de Informática Básica para el Aprendizaje en Línea): Well-known as the first national level implementation of the "one computer per child" (OLPC) model, this program was launched in 2006 to provide every Uruguayan, and school children in particular, access to computerized information and network experiences between homes, between homes and schools, as well as Internet access. It had a notable initial focus on equity; seeks to foster incorporation of digital, in order to narrow the digital gap between other countries, as well as between Uruguayan citizens, so as to facilitate more and better access to education and culture[13].

An assessment of the Ceibal Project conducted in December 2009 indicates that interesting results have begun to appear. First, even though the project's stated aim is digital incorporation, this has permeated schools and more than 50% of teachers (in schools participating in the Ceibal program) state that they plan computer-based activities both as individuals and as groups in the classroom, at least once a week and as many as 21% do so every day:

The use of the computers provided by Ceibal Project is not limited to the school. As part of the child's school supplies, the computer travels to different spaces of use and production of signifiers: the home, the school, and the community. Particularly as proposed for household tasks, there is an opportunity to project learning to the family space and endow this with new meaning as a space for learning, personal and study, all in one:

Huascarán of Peru: The Peruvian government has sought to channel everything related to content development and ICT access for educational purposes through this program. The Huascarán Project was conceived for a 10-year time frame: phase 1 (2002-2006) and phase 2 (2007-2011). Currently in the phase 2, its major achievements are:

I Incorporation of 3,040 institutions as part of the program, benefiting a total 2.5 million students

II Connectivity provided to 2,400 educational institutions

III Technological and pedagogical training in ICT provided to 56,600 teachers

IV Implementation of 14,700 computer stations and 1,170 servers.

Enciclomedia in Mexico: This national program offers Mexican children and teachers different ways of accessing knowledge. The main idea is to reinforce free textbook content with complementary digital educational material and support classroom learning with interactive chalkboards. Enciclomedia is an e-learning system consisting of a database didactically designed and planned on the basis of fifth and sixth grade primary school textbooks. Through use of a computer, interactive electronic chalkboard and projector, teachers and students have access in the classroom to the following material: free scanned textbooks, the teacher's website where students can view in advance the schedule of subjects that will

13 http://www.ceibal.org.uy/index.php?option=com_content&view=article&id=44&Itemid=56

14 Plan Ceibal monitoring and educational assessment: http://www.ceibal.org.uy/docs/evaluacion_educativa_plan_ceibal_resumen.pdf

be covered, files, professional development, papers and more. The goal for 2006 was to equip all 5th and 6th grade primary school classroom (over 165,000 classrooms) [15].

National Colombian Information Technology or Communications Technology Plan: Colombia's National Computer and Communications Plan states: "by 2019 every Colombian will be connected, making efficient and productive use of ICT to improve competitiveness through social inclusion. This year Colombia will rank among the first three countries of Latin America in the use of international indicators and ICT appropriation." [16] It is interesting to note that in Colombia, the National ICT Plan is the umbrella for Information Technology in Education. Plan's ambitious educational objectives are:

- To provide access to ICT infrastructure with world-class service level standards to the education community throughout the country.
- To end the country's digital illiteracy so that every member of society possesses ICT skills. Mechanisms for developing, assessing, and verifying digital skills must be designed that include government testing , as well as competency certifications in ICT use at other levels.
- To make periodic measurements of the progress of digital literacy in different population groups with result indicators.
- The effective use of ICTs to achieve high levels of quality and coverage of the educational offerings for all Colombians.
- To set in motion projects that expand the digital literacy process through efficient employment of community ICT access centers.
- To socialize knowledge, which requires adequate digital content management ; legislation and practices that protect intellectual property and copyright while also fostering and facilitating publication of knowledge on Internet. The Plan recognizes the importance of intellectual property and will promote the creation of instances to review the issue of education content in the digital context.
- To create a favorable environment (institutional, legal and others) that stimulates making best use of digital settings, for example, to recognize processes that promote teachers in their professions who demonstrate ICT competency and who make active use of these technologies in their classes and pedagogical processes.

The Plan's major projections for the future include:

- A program on the use of media and ICT (MTIC)
- A "Computers for Education" [17] program (upgrading of equipment for schools)
- Creating skills for ICT use in productive development
- Academic Advanced Technology Network, RENATA

TEC Plan of Chile: Since 2007 Chile's Education Ministry, through its Enlaces Program, has been implementing the Technologies for Quality Education

15 http://educondis.blogspot.com/2006/06/el-proyecto-enciclomedia-la-apuesta.html

16 Colombia: Política Nacional de TIC, Inclusión Social y Competitividad http://www.cintel.org.co/rctonline/pdf/12_Politica%20TIC.pdf

17 http://cpe.wikiole.com/

Plan (TEC) that aims to increase the presence of technological equipment in schools and ensure its use as pedagogical tool. The Plan focuses on kindergarten, primary and secondary education in government-subsidized schools. The Plan's three pillars are:

- Closing the Digital Gap: The objective is to attain a computer equipment standard in every school to reach a rate of 10 pupils per computer by 2010. This facet will be complemented by a minimum connectivity standard for schools where this is feasible.

- Digital Teaching Skills: The objective is to develop teaching competencies to enable teachers to conduct pedagogical activities supported by the technological infrastructure installed in the schools. The Plan calls for a complete offering of teacher training oriented to the acquisition of skills, including a self-diagnosis process and training to close the gaps detected in the diagnosis.

- Digital Resources for Learning: Makes available to schools state of the art educational content and software designed to support learning to take full advantage of technological infrastructure incorporated in schools and classrooms. Its special focus is on curriculum difficulties. This component also fosters innovation in ICT-based "Pedagogical Models."

TEC Plan's three pillars reach the school articulated through Educational Use of Technology Plans, which consist of school commitment on how to make best use of technological tools to improve results.

Proinfo in Brazil: Created in 1997 and still in place today, this program has advanced thanks to partnership with state and local governments. The alliance with state governments has been key to the program's success, in view of the importance of operational decentralization in its implementation. Its overall objective is to foster the introduction of new ICTs in state and municipal primary and secondary education networks, as a means to support pedagogical teaching-learning processes. Specifically, the program aims to: a) improve quality of teaching-learning processes, b) provide education that is integrated with technological and scientific advancement and, c) prepare students to exercise their citizenship and value the role of the teacher. PROINFO provides services such as the following: a) provides computer equipment to all public schools of more than 150 students that have fifth through eighth grade of primary school and, d) developed sub-programs to train teachers and modernize school institutional management. Training provided by PROINFO includes pedagogical, technical and administrative support, first, approaching training teachers as agents capable of replicating the experience within their school communities, and, second, fostering basic ICT use competency . By 2006, PROINFO had benefited 5,564 municipalities, had distributed 3,800,000

Proyecto Abriendo Futuro (Opening the Future Project), Technology for Teachers in Guatemala: The project began in 2007 as an initiative of the Education Ministry to enable public school teachers to acquire personal computers at an accessible price. The program seeks to develop technological skills of public school teachers, with rural areas as top priority aiming to produce gradual change towards a new educational model that fosters formation of citizens skilled in digital technology. A second stage involved implementation of a training strategy to enable these teachers to fully benefit from the resources and tools available for facilitating the teaching and learning process. The program includes a strategic line of action that develops digital resources and

services to encourage incorporation of technology in the classroom, based on the Education Ministry's National Baseline Curriculum. It also includes creating innovative practices through the use of technology in the teaching and learning process.

National *Information Technology in Education Program of* Costa Rica: Developed jointly by the Public Education Ministry of Costa Rica and the *Omar Dengo Foundation* in 1988, this program is probably one of the region's oldest. With primary education students as major beneficiaries, the program aims to narrow the digital gap through the incorporation of digital technology in rural and peripheral urban schools, throughout the country. It aims to develop cognitive skills, and a new professional culture, assisting schools that have information technology in education labs or a classroom computer. Its constructivist vision approaches pedagogical practice of computer use with the *Logo Writer* program, later updated with *MicroMundos*, which made it possible to illustrate various experiences through simulations students created with images, sound, video and other features. Its primary objective is to "tap the technological and intellectual potential of computers in ways new generations of Costa Ricans naturally act and think." (Fonseca, 1991)

The Caribbean: Many countries of the Caribbean have built systems that provide adequate access to computers and Internet in the schools and have developed the capability to design, implement, and administer information technology in education projects. Most secondary schools have computer labs with Internet connection, although few primary schools possess this infrastructure. Examples of progress four countries have achieved: Anguila now guarantees that all primary school pupils acquire ICT skills; Barbados and Trinidad and Tobago have developed ambitious and comprehensive technology projects in their secondary schools; the Dominican Republic, which had not adopted a ICT education policy when the report was written, now has installed computer labs with Internet connection in more than 50 percent of its primary and secondary schools; in Jamaica, the HEART Trust/ NTA organization provides computer and *e-learning* support to 80,000 vocational education students. The region's Education Ministries are seeing positive results as the product of the following investments: performance in the regional CXC – IT exam increased 32% between 2004 and 2005 in the Caribbean, in other words, children are more skilled in IT use. However, these skills still lag behind the competencies the labor market requires. To attain more sophisticated skills, IT must be incorporated as part of the standard education curriculum (e.g., teaching math or language with IT support). Yet serious obstacles continue to hinder teacher acquisition of digital skills, and this prevents integration. Consequently,, school education appears to be divorced from the competencies the labor market requires. (InfoDev, 2009).

An Experience in Regional Cooperation (Relpe Policy Network)

Another interesting regional initiative, one of the few successful associative experiences, is the Network of Educational Portals (RELPE) [18].

The network consists of 24 educational portals aimed for national, autonomous, public and free school systems designated by the Education Ministry of each country. Its guiding principles are:

- Each country develops its own portal in keeping with its national educational project and interests,

18 http://www.relpe.org/relpe/

benefiting from the experience of the other network partners, with complete independence for selecting the technological platform of their choice offered by the network.

- Content developed by portal members circulates freely in the Network.

- The free circulation of contents is made possible by the use of a technology, which permits countries to access and exchange all contents produced by fellow member countries.

RELP is not a portal, or even a portal of portals. Rather, it is a network of portals in which the most important aspect is that all nodes make available their own productions to the other nodes and each country takes what it considers most useful.

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