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ICT in Education: Report of current status e-Education worldwide and specifically in Suriname (Situational analysis)

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Abbreviations

ACI	Albert Cameron Institute
ADB	Asian Development Bank
AdeKUS	Anton de Kom Universiteit Suriname
ADSL	Asymmetric Digital Subscriber Line (also DSL)
AFD	Agence Française de Développement
ALICT	African Leadership in ICT Course
AMFIE	Asia-Pacific Ministerial Forum on ICT in Education
ATM	Ministerie Arbeid Technologische ontwikkeling en Milieu
BE	Basic Education
BEIP	Basic Education Improvement Program
BIB	Bureau Internationale Betrekkingen
BJZ	Bureau Juridische Zaken
BLO	Bureau Lager Onderwijs
BOB	Bureau Onderwijs Binnenland
BOP	Base of the Pyramid
BYOD	Bring Your Own Device
CAL	Computer Aided Learning
CAP	Community Access Points
CARICOM	Caribbean Community
CBvS	Centrale Bank van Suriname
CEIBAL	Conectividad Educativa de Informática Básica para el Aprendizaje en Línea
CFT	Competency Framework for Teachers
CIC	Community Information Center
CIPO	Context, Input, Process and Output
CKLN	Caribbean Knowledge and Learning Network
COL	Commonwealth of Learning
CPI	Christelijk Pedagogisch Instituut
CUS	Competitiveness Unit Suriname
DAE	Digital Agenda for Europe
DOCENT	Digital Online Curriculum Evaluation Network
DoE	Department of Education US
EBGS	Evangelische Broeder Gemeente Suriname
ECD	Early Childhood Development
ECDL / ICDL	European Computer Driving Licence / International Computer Driving Licence
ECLAC	Economic Commission for Latin America and the Caribbean
ECOIS	Expertise Centrum Onderwijs en ICT Suriname
EFA	Education For All
EMISS	Education Management Information System Suriname
ESP	Education Sector Plan
GDP	Gross domestic product
GESCI	Global e-Schools and Communities Initiative
GITR	Global Information Technology Report
GLO	Gewoon Lager Onderwijs
GPE	Global Partnership for Education
GTP	Global Teenager Project
HDI	Human Development Index
ICCO	Interchurch Cooperative for Development Cooperation
ICT	Information and Communication Technologies
ICT4D	Information and communication technologies for development
IDB	InterAmerican Development Bank
iEARN	International Education and Resource Network
IFIP	International Federation for Information Processing
IICD	International Institute of Communication and Development
InfoDev	Information for Development program (World Bank)
IPON	Innovatie Platform Onderwijs
IPR	Intellectual property rights
IT4WK	IT for World Kids
ITU	International Telecommunication Union
KIF	Key Implementation Factor
KO	Kleuteronderwijs
LVS	Leerling Volg Systeem
M&E	Monitoring & Evaluation
MDG	Millennium Development Goals
MINOV	Ministerie van Onderwijs en Volksontwikkeling
MOECD	Ministry of Education and Community Development

NATIN	Natural Resources and Engineering Studies
NCOSM	Nationaal Congres Onderwijs & Sociale Media
NGO	Non-Governmental Organization
OAS	Organization of American States
OBP	Onderwijsbureau Professionalisering
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OER	Open Educational Resources
OERU	Organization of Eastern Caribbean States Education Reform Unit
OLPC	One-Laptop-Per-Child
OLPF	One-Laptop-Per-Family
OPM	Onderzoek, Planning en Monitoring
PI	Pedagogical Institute
PROGRESS	Programma effectievere scholen Suriname
RKBO	Rooms-Katholiek Bijzonder Onderwijs
SABER	Systems Approach for Better Education Results
SEAMEO	Southeast Asian Ministers of Education Organization
SENA	Information Technologies and Communications and the National Learning Service
SNSCP	Suriname National School Connectivity Plan
SLM	Surinaamse Luchtvaart Maatschappij
SO	Speciaal Onderwijs
SON	Surinaams Onderwijs Netwerk
SPI	Surinaams Pedagogisch Instituut
TAS	Telecommunicatie-autoriteit Suriname
TCO	Total Cost of Ownership
TCT	Ministerie van Transport, Communicatie en Toerisme
TPACK	Technological Pedagogical Content Knowledge
TPD	Teacher Professional Development
TRC	Teachers Research Center
TVET	Technical and Vocational Education and Training
UIS	UNESCO Institute for Statistics
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCE	Virtual class E-learn
VLIR	Vlaamse Interuniversitaire Raad
Vlor	Vlaamse Onderwijsraad
VOIP	Voice Over Internet Protocol
VOJ	Voortgezet Onderwijs voor Junioren
VOS	Voortgezet Onderwijs voor Senioren
VSAT	Very Small Aperture Terminal
VUSSC	Virtual University for Small States of the Commonwealth
VVOB	Vlaamse Vereniging voor Ontwikkelingssamenwerking en Technische Bijstand
WAN	Wide Area Network
WEF	World Economic Forum
WSCSur	Stichting World Smart College Suriname
WSIS	World Summit on the Information Society (ITU)
ZZg	Zeister Zendinggenootschap

1. Introduction

This report presents the findings of a study on the current status of ICT in Education in Suriname and worldwide. It is the first deliverable in an overall assignment to support development of a national ICT policy and strategy for basic education in Suriname.

The assignment is being carried out by International Institute of Communication and Development (IICD, The Hague, the Netherlands) for the Ministry of Education and Community Development (MOECD) in Suriname, under the 2nd Basic Education Improvement Program (2nd BEIP). Sub-contractors are Free man management consultants (Ooij, the Netherlands), Edukans (Amersfoort, the Netherlands) and Projekta (Paramaribo, Suriname).

The main objective of this report is to provide insight into the current situation in Suriname regarding ICT in Education and to compare the national context with good practices elsewhere. Observations are made on experiences, lessons learned and challenges faced in Suriname and in other countries, to contribute to the design of the National ICT in Education Policy. The global review of ICT in Education is also aimed to provide clarity about what options might fit or not fit Suriname's situation in the future. In short, this report provides input to help stakeholders in Suriname decide what kind of ICT in Education are most relevant to their context.

ICT in Education have the potential to strengthen teaching and enable schools to change for the better. ICT in Education can accelerate, enrich and deepen skills; motivate and engage students; align in-school experiences with work practices; and raise the economic productivity of tomorrow's workers.¹

Defining what we mean by "ICT in Education" is an important first step in this report. We use the definition from "ICT Learning Outcomes for Primary Schools in the Caribbean, 2011", a study carried out for CARICOM.² That report defines information and communication technologies (ICT) in an education context as "computer, software, communication and other technology tools³ used to assist in the delivery of instruction, administration tasks and assessment of learning".

The broader term "ICT in Education" thus includes school administration tasks. MOECD has already developed a school administration tool and a management information system for the school system (called "EMISS", the Educational Management Information System Suriname). Therefore, this area will not be treated in the current report. The focus of this report is rather on the use of ICT in teaching and learning. We use the term "e-Education" for this.

Under the 2nd BEIP, MOECD's focus will be on ICT in basic education. Its main question is, "How can ICT be integrated in basic education to improve the quality of teaching and learning?" Both the teaching process and the learning process are deemed essential.

There are 5 main sub-questions for the research presented in this report:

- What is the current situation regarding ICT infrastructure in pre-primary and primary schools in Suriname?
- How might the quality of teaching be improved through ICT capacity building (in basic ICT skills, integration of ICT in didactic methodologies and in enhancing lesson preparation)?
- How might teachers use ICT to improve their teaching strategies and student learning?
- How are digital learning materials used in the classroom?
- How might ICT be used to enhance knowledge sharing among schools (teachers and students)?

This research used a combination of methodologies. Desk research was conducted, reviewing the current literature on e-Education in Suriname and worldwide. Furthermore, a kick-off workshop was organized to perform a quick scan among invited stakeholders. This

¹ Davis and Tearle (1999); Lemke and Coughlin (1998, cited by Yusuf, 2005)

² ICT Learning Outcomes for Primary Schools in the Caribbean, 2011

³ ICT tools may include a combination of phones, radios, TVs, tablets, cameras, blogs, interactive whiteboards, etc.

provided an overview of the current situation. Semi-structured interviews were held with stakeholders and two field visits were made to Brokopondo and Albina to see the situation outside of Paramaribo. In October 2013, the study will continue with a survey on e-Education in primary schools to investigate the situation in greater depth.

The research findings presented in this report are organized as follows. After this introduction, Chapter 2 outlines the basic education system in Suriname including its current and previous experiences using e-Education and identifying relevant projects and stakeholders.

Chapter 3 sketches an international overview of e-Education practices and ICT in Education policies, starting with the regions closest to Suriname and, after a global tour, ending with the activities of large international organizations. For each region and country mentioned, valuable recent reports are identified as well as key experiences, conclusions and recommendations. Where possible, the descriptions cover three aspects:

- elements of a national policy on ICT in education,
- roles of government and other actors in stimulating the use of ICT,
- ways that ICT is used in education and its outcomes.

Chapter 4 characterizes the status of ICT integration in Suriname. The model used is derived from a report compiled by the Southeast Asian Ministers of Education Organization (SEAMEO) in 2010. The model distinguishes 10 dimensions. The current situation in Suriname is compared with the dimensions described in the model.

Chapter 5 challenges stakeholders in the education sector in Suriname, listing recommendations derived from the study and raising questions related to the 10 dimensions of the SEAMEO model and the current status of ICT in Education in Suriname.

2. Current status of e-Education in Suriname

This chapter describes the current situation in Suriname regarding e-Education in the basic education system. It is based on a literature review, interviews, field visits and information collected during a kick-off meeting for a national policy on ICT in Education organized on 11 July 2013.

The aim of this chapter is to provide a baseline by describing e-Education in Suriname at the current time. It does not offer a complete overview of Suriname's education sector, including all of the reform plans being deliberated and under way. The focus of the chapter is wider than e-Education in public schools, as it looks at initiatives of other education providers too.

2.1 General profile Suriname

Suriname, officially called the Republic of Suriname, is a country on the northeastern coast of the South American continent. It is bordered by French Guiana to the east, Guyana to the west, Brazil to the south and the Atlantic Ocean to the north. This makes it, with French Guiana, one of only two countries on the continent that do not border any of Spanish-speaking countries. At just under 165,000 km² (64,000 sq mi), Suriname is the smallest sovereign state in South America. Suriname has a population of 566,000. Most live near the country's northern coast where the capital Paramaribo is located. The official language is Dutch.⁴

Suriname's GDP per capita is US \$12,398.⁵ It is classified as an upper middle-income economy.⁶ The Human Development Index (HDI) ranks Suriname 105th out of 185 countries.⁷ Life expectancy at birth is 71.⁸ Suriname is divided into 10 districts. Brokopondo and Sipaliwini are viewed as the interior, while the other outside Paramaribo districts are coastal districts.



⁴ Wikipedia

⁵ International Monetary Fund (IMF), 2012

⁶ World Bank, 2011

⁷ HDI Report, 2013

⁸ UNDP, 2010

2.2 Suriname's ICT readiness

The 2013 "Global Information Technology Report" features the latest results of the Networked Readiness Index, which offers an overview of the current state of ICT readiness in the world. Suriname scores relatively lower than comparable countries in terms of ICT, or Networked Readiness.⁹ Its overall rank is 117 out of 144 countries.¹⁰

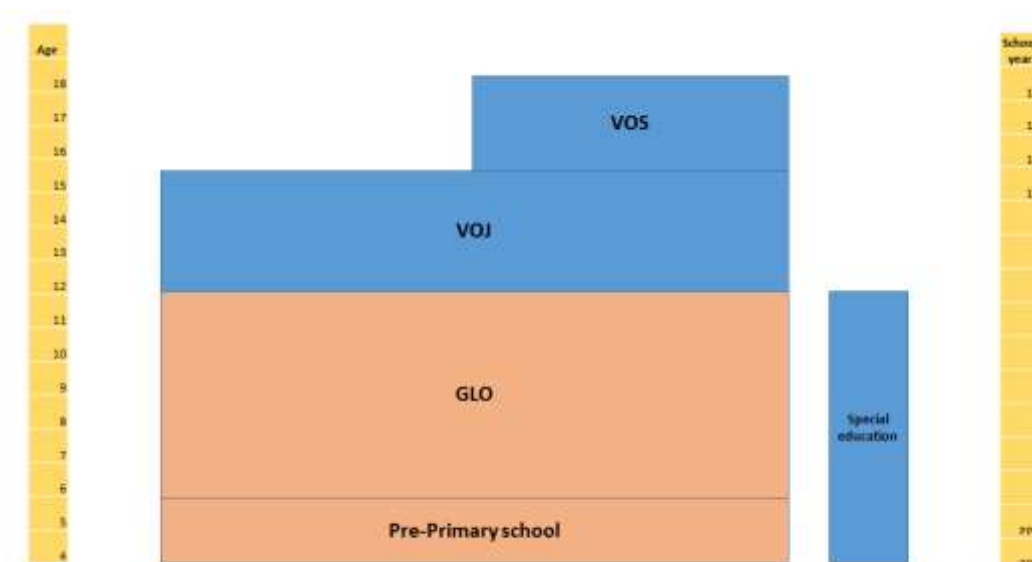
Suriname

	Rank (out of 144)	Score (1-7)
Networked Readiness Index 2013	117 ..	3.1
Networked Readiness Index 2012 (out of 142).....	121	3.0
A. Environment subindex	135 ...	3.1
1st pillar: Political and regulatory environment.....	135	2.7
2nd pillar: Business and innovation environment.....	125	3.4
B. Readiness subindex	100 ...	3.9
3rd pillar: Infrastructure and digital content.....	118	2.7
4th pillar: Affordability.....	90	4.6
5th pillar: Skills.....	89	4.5
C. Usage subindex	112 ...	3.0
6th pillar: Individual usage.....	79	3.1
7th pillar: Business usage.....	113	3.1
8th pillar: Government usage.....	138	2.8
D. Impact subindex	130 ...	2.5
9th pillar: Economic impacts.....	113	2.7
10th pillar: Social impacts.....	137	2.3



2.3 General overview of basic education in Suriname

In Suriname the formal education system consists of pre-primary school (2 years), primary school (6 years) and different types of secondary schools. "Basic education" in this report refers to pre-primary (KO or *Kleuteronderwijs*) and primary education (GLO or *Gewoon Lager Onderwijs*). It does not include secondary education, which consists of two levels: VOJ (*Voortgezet Onderwijs voor Junioren*, usually 4 years) and VOS (*Voortgezet Onderwijs Senioren*, usually 3 years). The figure below is a simplified version of the educational system in Suriname.¹¹



⁹ World Economic Forum Networked Readiness Index, 2013

¹⁰ For the full report see http://www3.weforum.org/docs/WEF_GITR_Report_2013.pdf

¹¹ <http://gov.sr/sr/ministerie-van-onderwijs-en-volksontwikkeling/over-minov/onderwijs/onderwijsstructuur.aspx>

The Surinamese educational system has multiple aims:¹²

- Improving the quality of learning by consistently focusing on the learning process and the pupil. This is viewed as best done by using a pupil-oriented and child-friendly approach. The starting point is to stimulate learning by each child, young person or adolescent on the basis of the unique talents and possibilities of each.
- Forming creative, self-confident and critical citizens, who can think and act independently. Young people are to be adequately prepared for active, positive and critical participation in social life.
- Instilling an ability to acquire social independence.
- Achieving optimal harmonious development of pupils and students by improving basic skills, learning achievements and social competencies. Equal attention is paid to the various professional and educational areas in the curriculum.
- Taking into account differences between pupils, with special attention given to children and young people with specific learning and development needs.
- Developing character, with the focus on basic values like honesty, sincerity, justice, loyalty, helpfulness, patience, friendliness, openness and respect.
- Building respect for and awareness of one's own and other cultures (diversity).
- Lifelong learning.
- Imparting knowledge of the country's history, political science, civics and love of one's country.
- Training teachers on the basis of a positive, pedagogical optimism.
- Building a sense of responsibility and commitment to the community. This is to help in the development of Suriname.
- Fitting in with modern national and international requirements, arrangements and trends.

Pre-primary education

Pre-primary education (KO) is considered part of early childhood development. Children begin pre-primary school at the age of 4 and go through a 2-year program in preparation for primary school.¹³ Pre-primary schools are often linked to a primary school, although they have their own teachers. In 2011-2012, Suriname had 17,285 children at the pre-primary school level.¹⁴ There were 559 KO teachers, 5 of whom were men¹⁵.

Primary education

Primary education (GLO) comprises 6 years. Children are enrolled from the age of 6 until about 12 years of age (education is compulsory from age 7 to 12).

In 2009, GLO net enrollment was 91%. That means that 91% of primary school-age children were actually enrolled in primary school in Suriname. However, disparities exist between the coastal and rural schools and those in the interior. The primary school drop-out rate is high, at 9.7%.¹⁶

After GLO (6th year) all children take an exam with two objectives: to determine whether the pupil is eligible to proceed to the next level (VOJ) and to determine whether the pupil is eligible for a school certificate (diploma) indicating successful completion of primary education. In 2013, the success rate for the exam to enter VOJ was 53%, while in 2012, the success rate was 61%. Success rates also depend on the district. Schools in the interior have the lowest success rates in Suriname. Sipalwini had a success rate of just 23% in 2013; that in Brokopondo was 30%.¹⁷

The largest number of schools is in the capital district of Paramaribo. The distribution of GLO schools in Suriname is shown in the table below.¹⁸

¹² Suriname Educational Plan (SEP). MOECD 2004

¹³ www.ibe.unesco.org/International/ICE47/English/Natreps/reports/suriname.pdf page 14

¹⁴ MOECD department OPM

¹⁵ 2010: <http://www.emis-sr.org/publicaties.html>

¹⁶ World Bank, 2009, <http://data.worldbank.org/indicator/SE.PRM.NENR/countries/SR-XJ-XT?display=graph>

¹⁷ MOECD Bureau of exams

¹⁸ MOECD department OPM

Distribution of GLO schools among Suriname's districts

District	Schools ¹⁹	%	Students ²⁰	Teachers ²¹
Paramaribo	119	35%	28840	2232
Wanica	54	16%	15203	1149
Para	21	6%	3969	391
Commewijne	24	7%	3534	391
Saramacca	12	3%	1848	181
Nickerie	27	8%	3725	394
Coronie	4	1%	406	43
Marowijne	21	6%	3260	211
Brokopondo	17	5%	2858	183
Sipalwini	45	13%	6182	351
Total	344	100%	69387	5435

Nearly all teachers in Paramaribo and the coastal districts are qualified. However, there is a huge shortage of qualified teachers in the interior. Overall, only 6% of teachers are men.

2.4 Developments in the education sector of Suriname

The government of Suriname is taking important steps to reform and improve its education sector and has named the sector a top priority. In order to achieve its goals, the Ministry of Education and Community Development (MOECD) believes in the importance of involving and working with different stakeholders. MOECD has formulated sector plans, as well as a specific plan for improving access to and the quality of education in the interior.

Two important programs are carried out by MOECD for primary education with funding from external donors: the Basic Education Improvement Program (BEIP) supported by the IDB and the Program for More Effective Schools in Suriname (Progress) supported by the Belgian bilateral cooperation (VVOB). Both programs provide substantial support for improvement of quality of primary education, e.g. teacher training. Other donors are UNICEF, VLIR and AFD.

In 2012, the President installed a special task force to lay the groundwork for innovation in education (*Voorbereiding Onderwijsinnovatie*). That task force analyzed the sector in its entirety and proposed ambitious plans for reform.

One of the most striking propositions is that schools in the interior should be "owned" by the communities themselves. As a result of the task force recommendations, two important changes have already been made in the education sector. First, subsidies for private and religious-based education providers have been significantly increased. This has made primary education (almost) costless for parents, as education providers no longer demand financial contributions from parents. The Taskforce was disbanded in 2013.

Secondly, in October 2012 the government started a massive national program of after-school care (*naschoolse opvang*), implemented in all schools, including those in the interior. This benefits parents, as they have more time to dedicate to economic activities. Furthermore, children now receive lunch at school and more time and guidance to do homework.

The government has also announced its intention to invest more resources in education infrastructure. It has started a program of maintenance for primary schools, construction of new classrooms and schools, and building new housing for teachers. The government

¹⁹ MOECD department OPM 2010-2011

²⁰ MOECD department OPM 2011-2012

²¹ MOECD department OPM 2011-2012

has indicated that this program is open to non-public education entities as well. If implemented, this too should increase access to education in the interior.

Of the multilateral donors, UNICEF is most active in support to the education sector in Suriname. UNICEF initiatives target the reduction of inequities in the education system, especially among indigenous and Maroon communities outside of the capital district. Another UNICEF focus is development of child-friendly schools. UNICEF programs recognize that disparities in the quality education are exacerbated by the difficulty of finding qualified teachers for schools in the interior. Some 30% of the teachers in the interior are not formally qualified to teach. In public primary schools in the interior, 5% of the teachers have not completed primary education themselves.²²

Another initiative to improve the quality of education is a multi-actor and multi-level Basic Education (BE) program, which started in 2011 as a collaborative effort of 9 Surinamese organizations.²³ The BE program (2011-2015) is facilitated by the ICCO Alliance as part of a larger program "From Aid to Entrepreneurship" that covers 14 countries and is financed by alliance member ZZg.

2.5 Ministry of Education and Community Development

The Ministry of Education and Community Development (MOECD), (in Dutch *Onderwijs en Volksontwikkeling*, or MINOV), is responsible for the educational system in Suriname, but it is also responsible for culture.

The educational system in Suriname is centralized and coordinated and regulated by MOECD. The Ministry is also the largest funder of educational services in the country.

MOECD has comprised two directorates since May 2010:

- Directorate of Education,
- Directorate of Culture.

Each directorate is led by a Permanent Secretary who reports to the minister. This report focuses on the Directorate of Education.

The main tasks (both political and official) for the management of MOECD can be classified in three levels:²⁴

- Strategic level. Gearing the organization for its environment and future developments, such as by establishment of strategic objectives.
- Tactical level. Equipping MOECD to accomplish its strategic objectives.
- Operational level. Conducting activities that contribute to attainment of the strategic objectives set.

Each directorate consists of departments (*Hoofdafdelingen*), each headed by a deputy Permanent Secretary. The organogram depicts the different departments.²⁵

²² <http://sr.one.un.org/education/>

²³ Alliance of 9 education-oriented multi-actor organisations among which are the education providers RKBO and EBGS

²⁴ See Needs Assessment of MOECD's Key Departments, Eriban Consultancy and Training, 2010

²⁵ Adapted from <http://gov.sr/sr/ministerie-van-onderwijs-en-volksontwikkeling/over-minov/onderwijs/organisatie.aspx>

Organogram of Suriname's Directorate of Education



MOECD and ICT

Suriname started late to develop formal policies for ICT in Education. According to UNESCO research,²⁶ among 38 Latin American and Caribbean countries, Suriname was one of only 4 countries in 2010 that did not have a national policy, a national plan, regulatory provisions or a regulatory institute in place for ICT in Education. According to that same study, Suriname had not yet introduced ICT-assisted instruction into the curriculum in any form, nor had trained any teachers in using ICT in teaching.

The "Suriname Competitiveness Agenda 2013" ranks the quality of Suriname's primary education 69th out of 142 countries.²⁷ That same report ranks access to Internet at schools. Suriname again scored low, ranking 125th out of 142.²⁸ However, another UNESCO study indicates that Internet access is available only in secondary schools (21% of these schools had Internet access in 2009), and not primary schools (0% had Internet access in 2009).²⁹

The delay in developing formal ICT in education policies is incongruent with the importance of ICT in Education as explicitly stated by MOECD in several reports. As early as 2006, MOECD published a report about education in Suriname which stresses the importance of ICT in Education³⁰. Some of the findings are presented in below.

"ICT should be brought in at basic education level. The introduction of computers in school offers new possibilities. There are three applications of ICT which should all be utilized in the course of basic education and in secondary level education:

- Learning to use ICT. Students learn in school how to use computers, acquiring basic skills and knowledge.
- Learning with the use of ICT. ICT is used as an auxiliary means for learning; it provides access to information and offers possibilities for communication with teachers and others. It can then be used to make assignments, collect and process information, and so forth.
- Learning through the use of ICT. The computer is used as an instrument of instruction and training, as an independent resource, which takes over the functions of the teacher in part or in whole. This application gives possibilities for various forms of distance education. ICT should also be used for management in the school. For example, for school administration and financial management."

An educational development report prepared by MOECD in 2006 announced that ICT should be introduced at both the primary and the secondary school levels.³¹

ICT within MOECD

According to a needs assessment of MOECD's key departments, a key challenge that the Ministry faces is its internal ICT situation:

²⁶ ICT in Education in Latin America and the Caribbean 2012 - UNESCO

²⁷ Guyana is ranked 56 and Trinidad & Tobago is ranked 38 in same research

²⁸ Guyana is ranked 98 and Trinidad & Tobago is ranked 61 in same research

²⁹ UNESCO Institute for Statistics database and Statistical Table II.2.

³⁰ *Educational Development in the Republic of Suriname* prepared for the 47th edition of International Conference in Education

³¹ *Educational Development in the Republic of Suriname* prepared for the 47th edition of International Conference in Education

"For all the departments examined, the ICT situation is the same: insufficient PCs, printers and the lack of networks. Some departments have a stand-alone PC with Internet connection, but the staff finds this insufficient. The most striking is the lack of an ICT department within MOECD. A Ministry of Education without a sound ICT strategy and without ICT applications in today's world is unthinkable. Employees must be able to network through ICT applications, e-mail, Internet, and collect gathering information from central databases, always obtain management information, and obtain management information at all time. Without ICT, there is almost no progress, now and in the future. The ICT situation in the ministry should change very soon.³²"

2.5.1 MOECD Department of Education

The Department of Education, under the Directorate of Education within MOECD, is responsible for primary and secondary schooling in Suriname.

Bureau for Primary Education

The Bureau for Primary Education (BLO) has two core duties in implementing the 11-year basic education cycle:³³

- supervision of the educational process and the teachers in basic education,
- ensuring and maintaining adequate material and personnel for public primary schools (including both the primary school level and the junior secondary level).

Currently, e-Education at primary schools is not approached in a systematic manner. In some schools, there are private initiatives supported by donors, companies or personal donations. Most of these focus on the use of small ICT labs to teach basic computing skills both to teachers and to students. Only a few schools according to BLO have developed their own digital learning materials. Few teachers currently have the skills to use ICT integrated into their lessons in the classroom.

About 100 schools participate in an "e-School" program. These therefore have some experience in the use of ICT for administrative purposes, especially to track student performance, although they do not use ICT in the classroom. Two teachers from each participating school have received basic ICT training to administer and use the e-School facilities.

Bureau of Education in the Interior

The Bureau of Education in the Interior (BOB) has three main responsibilities:³⁴

- counseling teachers and guiding the education process in the interior,
- safeguarding the quality of the materials and infrastructure at schools in the interior,
- planning and executing school construction programs in all regions in the interior (the recent extension of the basic education cycle to 11 years implies the need for more classrooms in schools).

The interior has 89 GLO schools (and 8 VOJ schools). It is a disadvantaged region with regard to education. This is why education in the interior is being given special attention. Due to the isolation of the region, education confronts some specific issues, such as a lack of teachers (they prefer to work in the coastal areas), expensive transportation for teachers to travel to and from the capital, poor infrastructure, a shortage of educational tools and appropriate curricula, insufficient guidance and inspection, and language difficulties (the population living in Suriname's interior often does not speak Dutch, which is the language of education).³⁵

Similarly, schools in the interior face many additional challenges regarding e-Education:

- lack of distance education for teachers who are not yet formally qualified (e.g., using a blended model with some face-to-face contact),
- lack of electricity in most schools (solar panels are little used in the country),
- shortage of fully qualified teachers,
- very limited ICT literacy among teachers,
- almost non-existent Internet access,
- lack of computers and digital learning materials in schools,

³² Needs Assessment of MOECD's Key Departments, Eriban Consultancy and Training, 2010

³³ Needs Assessment of MOECD's Key Departments, Eriban Consultancy and Training, 2010

³⁴ Needs Assessment of MOECD's Key Departments, Eriban Consultancy and Training, 2010

³⁵ www.vvob.be/vvob/en/news/capacity-development-better-education-interior-suriname

- little ICT support capacity (from local private companies) in the interior, meaning that for maintenance, support and training, travel to Paramaribo is required.

VVOB and UNICEF are collaborating with BOB to support small e-Education pilots in the interior. We return to these in section 2.5.

In 2010, ECOIS, an expertise center, developed a proposal for BOB to conduct a distance learning pilot to build the capacity of unqualified teachers in the interior (*Proefproject Bijscholing Leerkrachten Binnenland via Modern Afstandsonderwijs*). This plan, however, was not implemented.

Inspectorate of Primary Education

One of the main tasks of the Inspectorate of Primary Education is to screen pre-primary, primary and special education schools in accordance with the "CIPO model" (Context, Input, Process and Output).

The Inspectorate of Primary Education counts 16 rayons (each with a group of between 10-30 schools). ICT is little used by the inspectors. Correspondence by e-mail is increasing, but the offices of the Inspectorate at MOECD do not have access to the Internet. ICT skills need to be developed, although some inspectors do have the capacity to support colleagues.

The Inspectorate supports integration of ICT in all subject areas. It views mathematics and history as particularly challenging areas. ICT (including videos) was seen as a way to make subjects more interesting for students and teachers. Most schools work with teacher-centered methodologies, with few using child-centered approaches.

Some schools have a multimedia facility with donated computers. MOECD has stated its intention to supply all public schools with 1 or 2 laptops for use in tracking students' grades and development as part of its LVS e-School program. The Inspectorate will also have access to these data. At the moment, a pilot is being conducted in around 100 schools.

The Inspectorate was not aware of any instances of ICT being used in the classroom to improve the quality of teaching. Neither did it know of examples where digital teaching materials or e-Learning were in use for students or teachers in primary schools in Suriname. According to the Inspectorate, many teachers do have a personal laptop. However, they do not use these in the classroom.

2.5.2 MOECD Directorate of Development Services

The Directorate of Development Services is responsible for innovations in the Surinamese education sector. This Directorate mentioned one example of e-Education: A virtual classroom had been donated to Suriname during Virtual Educa 2012. The initial plan was to use it at Anton de Kom Universiteit Suriname (AdeKUS), but that did not happen.³⁶ At the time of this writing, there were plans to install it at MOECD for different groups to try it out. This was still to be implemented.

The Directorate noted the importance of carrying out refresher training for teachers. This is difficult to realize face-to-face in the interior, as no facilities for distance learning have been developed.

Department of Research, Planning and Monitoring

The Department of Research, Planning and Monitoring provides statistical information about the education sector through a management information system -- the Education Management Information System Suriname (EMISS).³⁷ It is not involved in e-Education initiatives.

Department of Curriculum Development

The Department of Curriculum Development is geared towards supporting MOECD in improving the quality and efficiency of primary education through curriculum development, provision of textbooks and teaching materials, and improved teacher training with respect

³⁶ www.oas.org/en/scholarships/virtualeducacaribbean.asp

³⁷ www.emis-sr.org/publicaties.html

to both subject content and methodological knowledge. This is done in coherence with the recently introduced new basic education cycle.³⁸

The Department was aware of several pilot initiatives within the primary school sector in Suriname: the LVS e-School program, EMISS, Klasse TV, IT4WK and computers donated by the first lady.

ICT is not yet being used in any structural way by the Department. Nonetheless, it did suggest that there are clear ideas and important questions to answer about the future, as ICT is not yet being used to improve learning outcomes in primary schools in Suriname.

According to the Department:

There is no clear overview about what has been done. What is done within the primary school sector in Suriname is not done in a structured way. Good practices in other countries are not used. Suriname should make clear choices: this is the model that we will use. Clear choices are important in such a process.

MOECD School Radio and TV Department

MOECD's School Radio and TV Department has experimented with development of instructional videos and simple (gaming) apps to support a more attractive curriculum (e.g., with math and language games) and for testing students. A demonstration had been given to the National Steering Committee on Reintroduction of Diagnostic Testing (*Stuurgroep Herinstructie Diagnostische Toets*). The current status of the project is not known.

Professionalization Department

The Professionalization Department is mandated to improve, and thereafter to maintain, the quality of teaching and learning in Suriname. It organizes and coordinates training and guidance activities for teachers at GLO, VOJ and VOS schools as well as for MOECD staff.

The Department emphasized the need for continued broadening and deepening of competences acquired by teachers during their initial training. This should lead to learner-centered and child-friendly teaching and learning. The activities are to be organized in a sustainable way. The vision of the Department is "Quality in education starts with me".³⁹

2.5.3 MOECD services

Office of Legal Affairs

During the kick-off meeting, several participants noted that the introduction of e-Education in primary schools could generate an increase of teaching hours. Should this be proposed, the Office of Legal Affairs would be involved in the process.

2.5.4 MOECD 2nd Basic Education Improvement Program

The aim of the 2nd Basic Education Improvement Program (BEIP) is to improve the learning outcomes of students in the education system nationally from pre-primary through junior secondary education and to improve the internal efficiency and quality of the new basic education system.

The program is a two-phase operation spanning an 8-year period. Phase I extends from year 1 to 4; phase II is years 5 through 8.

The first phase of 2nd BEIP focuses primarily on improving learning outcomes in the junior secondary grades. Its focus will initially be on four components: (i) improving teaching methods and learning outcomes of students in grades 4 to 8, with an emphasis on Dutch and mathematics; (ii) ICT in Education and implementation of pilots to test different strategies for utilizing ICT; (iii) increasing access to education through school construction and expansion and by building teacher housing in the interior; and (iv) improving management of the education system within MOECD and at the school level.

³⁸ Needs Assessment of MOECD's Key Departments, Eriban Consultancy and Training, 2010

³⁹ <http://gov.sr/sr/ministerie-van-onderwijs-en-volksontwikkeling/actueel/training-gedragsproblemen-begonnen.aspx>
24-01-2013

Under the second component – “(ii) ICT in Education and implementation of pilots to test different strategies for utilizing ICT” –, 2nd BEIP will finance diagnostics of existing studies and initiatives in ICT and development of a national ICT in Education policy and strategy.

2nd BEIP is being financed by a US \$13.7 million loan from the IDB and an own contribution by the Republic of Suriname amounting to US \$750,000.

2.5.6 MOECD clusters

Primary schools in Suriname are grouped into rayons. The rayons are subdivided into clusters (with a number of schools). Each cluster has a chairperson. The objective of the clusters is to provide a platform for schools to share experiences.

As part of the current study, four cluster representatives (Kwatta, Parwasbo, Leding and Flotam) were consulted to get an impression of the types of initiatives under way and challenges faced within the clusters. The findings were as follows:

- Many schools have small ICT initiatives supported by individuals, companies or Dutch schools.
- ICT is mostly used to build basic ICT skills. It is not yet integrated into classroom teaching.
- Most schools use ICT for school administration.
- There is a lack of digital education content within the curriculum, although in some schools, educational software has been developed.
- Primary schools have no Internet access.
- Maintenance of the computers received is a big challenge outside of Paramaribo.
- Few teachers have the capacity to integrate ICT into their classroom routines.

2.6 Education providers

Most GLO schools are public schools (172 schools)⁴⁰, but nearly half of primary schools are run by religious organizations such as the Moravian Church (EBGS, *Stichting Onderwijs der Evangelische Broedergemeente*)⁴¹ and the Roman Catholic Church (RKBO, *Rooms Katholiek Bijzonder Onderwijs*). There are other types of organizations who also run schools, and private schools as well.

2.6.1 EBSG schools

The EBSG supervises 59⁴² GLO schools with some 900 teachers in total. All EBSG schools participate in clusters (group of schools). Results are shared within clusters to stimulate peer review and “intervision” (a method of learning from and with colleagues).

ICT is not yet being used to improve teaching and learning. ICT is used by school managers to monitor and report on progress. Every 6 weeks, school managers submit an Excel report with school results by email. EBSG does not participate in the LVS e-School program.

EBSG sees ICT in Education as more than just the use of computers. Mobile phones could also play a role. At the moment, schools tend to focus on negative effects of mobile phones in the classroom: “it disturbs the lessons”. EBSG suggested looking positively at the impact of mobile phones. For example, a pupil might use a Blackberry to search for information. Thus, EBSG was of the opinion that the mobile phone should be regulated, not banned.

2.6.2 RKBO schools

The RKBO supervises 64⁴³ GLO schools. The RKBO schools participate in clusters (group of schools).

RKBO notes that there are many small ICT initiatives, and that these face many practical challenges. Some 80% of its school managers do have basic ICT literacy skills and a personal laptop at home. In the interior districts, electricity is a major problem. Suriname makes little use of solar power. Some schools, such as in Para, are participating in a

⁴⁰ MOECD department OPM 2010

⁴¹ MOECD department OPM 2010

⁴² MOECD department OPM 2010

⁴³ MOECD department OPM 2010

multimedia center pilot in which UNICEF will donate 15-20 PCs to each school. A local provider, if available, will take care of maintenance. Presently, most teachers lack the required ICT skills.

The current method of teaching is said to do little to trigger children's curiosity. The main focus is on reciting knowledge. Challenging children to investigate and stimulating creativity are needed for further development. Children can also learn a lot outside the classroom, beyond their in-class activities, but few teachers use this method anymore. Instead, they focus on the blackboard and textbooks, bypassing the fact that many students are visually triggered.

Classes are too big, teachers are overburdened, and too many new tasks increase job pressure. RKBO suggested that each reform should be implemented gradually, and that teachers need help to teach in a more exciting way. ICT could be a tool for this, but it is not necessarily the only tool. While ICT could be used to transfer knowledge, RKBO felt that it should mainly be used to trigger curiosity.

RKBO does not participate in the LVS e-School project, which is limited to public schools. It is interested in participating in programs on the use of ICT for school administrators.

Furthermore, RKBO said that the qualifications of teachers in the interior need to be upgraded. Distance learning could be used to do this, though it is not yet available in the country. In Suriname, educational policy development was said to be too top-down. It would be better to stimulate local initiatives from the bottom up and then embed them in a national policy.

Regarding school consultations, RKBO advises that they be held as late as possible in October, not only in Paramaribo but also in Nickerie, Brokopondo and Marowijne. RKBO indicated that one day per region should be enough and would prevent students from having to miss classes. It stated that BEIP had caused a loss of lesson time in previous years.

RKBO and EBGs stated their main priorities as follows:

- quality improvement of school managers,
- quality improvement of teachers (more exciting lessons),
- time, space and money to replace methods that do not work with methods that really do work.

Note that ICT is certainly not number 1 on this priority list!

2.7 UNICEF and VVOB

2.7.1 Computer-aided learning in Suriname (UNICEF)

One of the ICT initiatives currently under way in Suriname is being conducted by MOECD in collaboration with UNICEF. In April 2013, a pilot started in which math and Dutch language were taught with the assistance of computers in 5 schools in the interior (in Ricanaumofa, Matta, Powakka, Marshal Kreek and Brownsberg). This is part of the Computer-Aided Learning Project implemented by MOECD and led by UNICEF. Each participating school received 25 laptops. Educational software was made available on the laptops for math and Dutch language. Teachers took part in training to use the laptops in the classroom.

The project had a long start-up period, and was initiated only after a needs assessment and a baseline study. Initially, laptops from the One-Laptop-Per-Child (OLPC) program were to be used. In the end, a Windows laptop from Skoolmate was chosen, because the Dutch educational software was not available for the OLPC laptops. Originally, a US Peace Corps volunteer was to support the project, but currently a Dutch-speaking staff member is supporting the schools.

Dutch software was selected for math and language learning (Ambrasoft from Noordhoff, free license). The software works offline, so no Internet access is needed. Teachers work according to a teacher-centered methodology (classical). Introducing a learner-centered approach or working in small groups would be one step too far at the moment.

Although the laptops are not yet networked (if this is even technically possible for these laptops), smart measures are being introduced to monitor students' progress. The project is supported by a coordinator who visits the schools on a regular basis. During the pilot, good practices were collected and shared. After the pilot, recommendations and lessons learned will be disseminated for larger scale implementation.

2.7.2 VVOB "I Believe in You"

MOECD, together with VVOB and UNICEF, published the report "I Believe in You" (to demonstrate that teaching and learning could be done differently and that computers could play a role in this).

Excerpt from VVOB-UNICEF report, "I Believe in You"

"Is it about copying the teacher or about learning? Is the teacher really concerned with real learning? Is the pupil himself concerned with learning? Does the pupil have to wait or may the pupil participate actively? The ideas about learning have changed drastically in the last few decades. The world is changing so rapidly at the moment that we hardly know what it will be like tomorrow. A huge quantity of information is available not only through the teacher, but also and especially from other sources like television and the Internet. All this has an effect on the pupils and the learning of today and of tomorrow. The pupils enter school with increasingly different experiences and needs. In the field of computing (ICT), young pupils may be miles ahead of their teachers. The present school system is still based mainly on old models that focus on the transfer of knowledge from teacher to student. The old model is not always a matter of learning but rather of copying and learning things by heart unquestioningly. Thinking critically by oneself is not stimulated enough. A head teacher put it as follows, "Our pupils no longer care for education in its present form."

(p. 22)⁴⁴

2.7.3 VVOB PROGRESS

MOECD and VVOB collaborate in the PROGRESS program (*Programma Effectievere Scholen Suriname*). PROGRESS started in 2008. In the 2011-2013 period, it focused on the following objectives:

- capacity building within the Inspectorate and the department of Guidance
- capacity building of teachers to increase the quality of primary education,
- support to professionalize teacher development in collaboration with Suriname's pedagogical institutes and the schools,
- development of the Education Management Information System Suriname (EMISS),
- capacity building of "nucleus centers" in Brokopondo and Marowijne (see also section 2.5.4),
- capacity building of MOECD management.

Progress concluded that ICT had not yet transformed the roles of teachers and students in Suriname. Neither is there evidence as yet of improved learning outcomes in the country.

2.7.4 Nucleus centers

In collaboration with the Bureau of Education in the Interior (BOB), VVOB has developed a program to build the capacity of teachers in the interior. VVOB started the project in 2010 to build capacity of what is called "nucleus centers".

MOECD opened two centers in November 2008 in the districts of Brokopondo and Marowijne. Those centers are intended to function as strong knowledge and training institutions in both formal and informal education for the communities in their district. MOECD aims to decentralize some of its services to these centers. Furthermore, through them, MOECD wishes to offer opportunities for teachers in the interior districts to continue their professional development. As such, the nucleus centers are equipped with classrooms for guidance and inspection as well as a training room, a library and an ICT room.

The nucleus centers face a number of challenges:⁴⁵

- shortages of staff,
- lack of required competences among staff (most staff members are teachers),
- lack of resources (e.g., no funds for maintenance or transport),
- infrastructural difficulties (e.g., old computers and power cuts).

⁴⁴ "I Believe In You" p22

⁴⁵ <http://www.vvob.be/suriname/nieuws/capaciteitsontwikkeling-voor-beter-onderwijs-in-het-binnenland-van-suriname>

The research team visited both nucleus centers during a field trip in July 2013.

Brokopondo

The ICT lab in Brokopondo was in a wretched state. Only 6 of the 20 computers donated in 2008 were still functioning. Local maintenance was and is still a big issue. Requests to MOECD to repair them in Paramaribo had not yet been approved. At the time of this writing, there was no staff member with sufficient ICT skills to give ICT training to teachers, students or community members. Until 2012, training was given by a staff member for three days in the week. They also received support from US Peace Corps volunteers.

The nucleus center has a library too, and the MOECD inspectors have an office from which they provide teacher training (e.g., in new educational developments and education-related laws). They further provide training to community members, especially members of parents' associations. The nucleus center has a laptop and a beamer for use in trainings. VVOB provided management training to center staff in January 2013, including vision and mission development and formulating a planning document (a "growth" document). That training included basic ICT skills. An evaluation of the project will be conducted in August 2013. The center is trying to raise funds for new PCs from local mining companies.

Albina

In Albina, the ICT situation was worse. None of the 20 donated computers was working. This had actually been the case for the last 2 years. The same situation applied here as in Brokopondo: no local ICT support is available, only in Paramaribo. MOECD had not yet approved repairs, although several requests had been sent. The center lacked sufficient funds to have the computers repaired itself. The ICT coordinator, who assists schools in their administration, was scheduled to take a course in computer maintenance. The center does have a WiFi connection that people can use with their own devices. Laptops are used for private purposes, like watching films or gaming, not for teaching purposes. Local secondary school students used center facilities for their thesis research, but their school now has its own computers, though still too limited in number. In the district, the coordinator knew of only one primary school that had PCs: Erowarte.

In the Moengo district, all public schools participate in the LVS e-School program. Each school had one laptop, but none had Internet access as yet.

The coordinator of the Albina nucleus center was using digital teaching materials (PowerPoint presentations) provided by MOECD to prepare for her teacher trainings. In her experience, "PowerPoint can be very boring if not well used."

Iporoma School, Erowarte

Iporoma School, Erowarte, is a small school in the Marowijne district. It received 6 computers 3 months ago, and the teachers received training from a US Peace Corps volunteer. The computers were being used for basic computer lessons. No educational software was in use. The school had requested the nucleus center to provide training to the teachers. Since it is a small school with learner-centered teaching methods (working in small groups), teachers would like to have Internet connectivity to do research.

2.8 ICT initiatives in other ministries

2.8.1 Cabinet of the Vice-President

The Cabinet of the Vice-President is responsible for the National Development Plan. One of its working groups is the e-Government committee. The National Development Plan states that ICT is essential for modernizing Suriname. Its main focus is to use ICT for governmental services (e-Government).

2.8.2 Ministry of Transport, Communication and Tourism

The Ministry of Transport, Communication and Tourism (TCT) is coordinating the development of a national ICT strategy. It also established of a committee to create a

national ICT institute.⁴⁶ The institute, though planned in 2006, had not yet been implemented.

This Ministry had furthermore conducted research leading to the design of a strategy for e-delivery of government services to the interior of Suriname. A report from that work, entitled "Reducing Disparities through the Use of ICTs in Suriname", focused on sustainable "community access points". Education could make use of these access points with content such as distance education modules. Schools could also be set up as community access points. The community access points are not yet implemented.

The Ministry organized a seminar on ICT for development in 2011.

2.8.3 Ministry of Labor, Technological Development and Environment

The Ministry of Labor, Technological Development and Environment has been actively engaged in ICT-related issues, participating in regional policy discussions and meetings.

2.8.4 Telecommunication Authority of Suriname

The Telecommunication Authority of Suriname (TAS) prepared a draft "Suriname National School Connectivity Plan" in collaboration with the International Telecommunications Union (ITU). The launch of this plan was in May 2013.⁴⁷ Part of the plan was a pilot involving 4 schools that received a computer lab, broadband Internet access, a printer and a scanner. Results of the pilot are not yet available.

One telecom provider, Telesur, planned to deliver a new service called "virtual classroom e-Learning" (VCE). However, the service is as yet unfeasible in terms of financing and sustainability, so it had not yet begun. Telesur is Suriname's only broadband provider. According to TAS, bandwidth is available, and as Telesur is a state company, it could utilize the bandwidth for non-commercial projects such as Internet access for schools.

2.8.5 Central Bank of Suriname

The Central Bank of Suriname is actively promoting ICT as of key importance for the development of the country. On 3 May 2013, the Central Bank hosted the one-day conference "Improving Suriname's Position in IT-Related Indices of the UN, the World Bank and the World Economic Forum". The conference envisioned collaboration between private- and public-sector experts to develop a long-term strategy and roadmap towards the improvements required. In this endeavor, Suriname will receive support from South Korea and Singapore. The Central Bank of Suriname also is in contact with Chinese suppliers for ICT devices for schools.

2.9 Other ICT initiatives in the education sector

Many schools in Suriname have benefitted from private ICT initiatives, funded by individual donations, NGOs or private companies.

2.9.1 ZZg

ZZg is a Dutch religious charity that supports primary and secondary school projects in the interior districts of Suriname. One of the initiatives under discussion now is a computer information center at Barron School in Moengo. Part of the proposal is a helpdesk that will be run by local young people who receive special training for this. This would create local computer-related jobs. The pilot has not yet started.

2.9.2 Pedagogical institutes

In April 2012, a report entitled "The New Teacher" (*De Nieuwe Leerkracht*) was published proposing reform of Suriname's pedagogical institutes. The proposal was launched by the directors of the pedagogical institutes and Progress.

Reasons put forward for reforming pedagogical institute

"The proposal mentions new developments in society, especially new ways of communicating. School is not the only place to acquire skills and knowledge. An overflow of information, news and knowledge is reaching the youth through new communication channels. Young people need to learn to deal with this overflow and evaluate information in a critical way. Modern

⁴⁶ UN Economic Commission for Latin America and the Caribbean: Suriname's Information Society Country Profile 2006

⁴⁷ www.tas.sr/index.php?option=com_content&view=article&id=79&Itemid=349&lang=en

communication tools bring events and news instantaneously from everywhere in the world to Suriname".⁴⁸

ICT is not mentioned much in the rest of the report. ICT is not seen as the most urgent challenge to solve in new teacher training.

The pedagogical institutes recently began to work with a new methodology. ICT is integrated in the working groups curriculum and at the management level. One of the institute directors was very enthusiastic about this "TPACK" model⁴⁹ for integrating pedagogical knowledge, technology knowledge and content knowledge. This model is also used within IICD.

Important in the new methodology is that pedagogical institute teachers move slowly towards a more learner-centered and competence-based approach. This could also be achieved without ICT. The selection criteria for new students at the institutes were tightened as well. As a result, the students admitted now are more committed to teaching as a profession. The institutes are preparing for their second year of implementing the new methodology.

Next year WiFi will be introduced. Many students have their own laptop, so a "Bring Your Own Device" (BYOD) model will be possible.

Four pedagogical institutes (ACI, CPI, SPI and SGN) implemented a twinning project with a Dutch teacher training college in 2009-2011 (the Dutch school was the Hengelo-based Hogeschool Edith Stein). Multimedia cases were developed with videos of education in different contexts in Suriname.

An interviewee at one of the institutes had this to say about the challenges faced:

"MOECD should have in mind different implementation strategies for Paramaribo, the coastal areas and the interior and for the different service levels. The access to services differs extremely. The divide between extremely rich and extremely poverty is also wide. Some children arrive at school everyday with a SUV and have their own laptop (and tablet). Could "Bring Your Own Device" work in some schools?"⁵⁰

2.9.3 Special education

ICT could play an important role in educating children with special needs. ICT nonetheless does not feature prominently in a 2011 report on the development of special education in Suriname ("*Het Speciaal Onderwijs in de Steigers*"). That report did make a very valid statement about the need to combine content and pedagogical skills with ICT skills and quality lesson materials.

Excerpt from report on special education in Suriname

"Teachers should not only be trained in content skills of their own subject, but this should be combined with pedagogical skills, ICT skills and high-quality teaching materials".
(p. 2)

2.9.4 Expertise Center for Education and ICT Suriname

The Expertise Center for Education and ICT Suriname (ECOIS) is an NGO based in Suriname.⁵¹ Since 2010, it has published newsletters about new developments in the country in the area of ICT in Education. It also has a website listing resources, ICT in Education initiatives and training courses.

ECOIS actively promotes ICT in Education. A main activity was to serve as the implementation organization of the Suriname-Netherlands Twinning Facility in 2008. In May 2010, it organized a one-day seminar on ICT in Education in Suriname. A similar event followed in April 2011.

In 2012, ECOIS produced a CD-ROM containing information and resources for teaching professionals (*Onderwijs & ICT Bronnen voor Onderwijsprofessionals*). The CD-ROM

⁴⁸ Voorstel tot gefaseerde vernieuwing van de opleiding' p12

⁴⁹ www.tpack.nl

⁵⁰ Interview with Christian Pedagogical Institute (CPI)

⁵¹ www.ecoisonline.org

includes educational software, MOECD tests and GLO exams for 2007-2011, alongside Dutch language teaching materials.

ECOIS warned about high expectations for ICT in the education sector.⁵²

Excerpt from ECOIS newsletter

"IDB studies conducted earlier demonstrated that clear effects of massive and costly investments in ICT in Education were disappointing. We need to be realistic and to focus on achievability. The importance of ICT as major engine of economic development is indisputable. From that angle, the question is whether the ambition for the coming years may be high enough."⁵³

2.9.5. iEARN

The Global Teenager Project (GTP) called Learning Circles Suriname-Netherlands started in 2008 as a twinning project. It introduced education software for regular and special schools. iEARN and IICD partnered in the project. Activities included exchanges between Dutch and Surinamese schools during a "learning circle" in which 6 schools collaborated on a chosen topic. Teachers also received training in basic ICT skills.

2.9.6 Informatie Technologie In Suriname' (ITIS)

The project ITIS of the foundation PROBITAS focuses on ICT in Education. This is a private initiative in its planning stage. It will not only focus on primary schools, but will include other social organizations as well.

2.9.7 Stichting Lin, KlasseTV

Five Dutch educational publishers will provide digital educational content to Suriname's primary schools. Much of this content is already in use in Dutch schools, but it is also appropriate for schools in Suriname, since the language of education is Dutch there as well. The publishers have created a digital portal for teachers and students together with KlasseTV (www.Klassetv.nl). Various resources are included:

- instructional videos,
- digital education packages for group projects,
- interactive educational games, and
- information about excursions.

⁵² www.ecoisonline.org/mod/forum/discuss.php?d=179

⁵³ ECOIS Nieuwsletter, Sept. 2012

3. A global perspective on e-Education and ICT policies

This chapter presents an overview of e-Education practices and ICT in Education policies from a global perspective. Various regions are described based on desk research conducted with available literature. Good practices and lessons learned are distilled that could be valuable for the development of a National ICT in Education Policy of Suriname.

3.1 The Caribbean

3.1.1 Overview of ICT in Education in the Caribbean

Gaible (2008) provides an overview of ICT in Education in the Caribbean.⁵⁴ Below a selection of relevant findings is listed for the ICT policy development.

Findings from Gaible (2008) relevant to development of an ICT policy

“Findings related to policy development:

- Most governments have drafted or approved ICT policies in education.
- ICT policies in education have had limited impact in practice.

Findings related to institutions and management:

- Organizational understanding of issues surrounding ICT in education is low.
- Many individual government staff members have strong understanding of issues surrounding ICT in education.

Findings related to ICT infrastructure:

- Hardware quality and maintenance pose critical challenges.

Findings related to ICT curricula and to assessment:

- ICT curricula and the current position of ICT teachers pose barriers to the use of technology to support learning in other subjects.⁵⁵
- The high reliance of exams for assessment limits the potential for changes in classroom practice.

Findings related to teacher professional development (TPD):

- TPD models tend to teach ICT skills separately from pedagogical skills.
- Pre-service teacher education does not provide adequate introduction to ICT and does not address the use of ICT to support teaching and learning.

Findings related to teaching and learning in the classroom:

- Students have limited access to ICT for learning in non-IT subjects.
- Support for integration of ICT across curricula has not influenced teachers' activities.
- The impact of technology on learning outcomes in the Caribbean has yet to be demonstrated.

Findings related to regional cooperation:

- Cooperative efforts by the Organization of Eastern Caribbean States Education Reform Unit (OERU) and education ministries have influenced policy development.
- Cooperative efforts by OERU and education ministries to support information management have not had impact”.

Suriname is not included in the report as a separate survey country. One reference does note that Suriname implements the One Laptop per Child project. This was a Telesur project, but the website mentioned no longer exists.

3.1.2 CARICOM report on national ICT policies

More recent, and not focusing on education only, the CARICOM (2010) draft regional strategy on ICT for development⁵⁶ highlights the importance of national ICT policies.

Excerpt from CARICOM (2010) on national ICT policies

Developing countries are expected to embrace the World Summit on the Information Society (ITU) initiative,⁵⁷ and to build their strategic visions on exploiting the dynamic relationship

⁵⁴ Gaible, Edmond (2008), Survey of ICT and Education in the Caribbean: A Summary Report based on 16 Country Surveys. infoDev/World Bank

⁵⁵ If the focus is too much on teaching ICT skills to students, integration of ICT in other subjects is hindered (IICD)

⁵⁶ CARICOM (2010), "Draft Regional Information and Communication Technologies (ICT) for Development Strategy"

⁵⁷ WSIS phase 1 took place in Geneva 2003, and the second phase took place in Tunis in 2005.

between the use of ICT and innovation. It is accepted that, compared to the rest of the world, the Caribbean region in general continues to lag behind as a result of the quantum leap in new technology applications in the ICT sector. The entire region can still reap benefits. However, if there is strategic focus on implementing a targeted sector driven process, with continuous benchmarking in order to maintain a sustainable advantage of the opportunities offered by the chosen sectors. The CARICOM Connectivity Agenda and Platform for Action provide a conceptual framework and general guidelines for Member States to develop; countries are implementing ICT development projects to support sectors of the economy. As such, all countries that develop ICT strategies use similar models.

(p. 55)

Expectations are raised in this report that CARICOM has developed a conceptual framework and general guidelines for Member States. However that framework is still in the planning phase.

Challenges noted in CARICOM (2010)

Trends in ICT in Caribbean education are lack of equipment and access. Educational challenges continue to include too much focus on IT curriculum and exams; ineffective, technology-focused teacher professional development, and few initiatives focusing on technology integration across all subject areas. Some work is being done at tertiary level to deliver training and to collaborate in delivery of curricula through the CKLN. It is likely to provide affordable access to modern technologies.

(p. 62)

3.1.3 CARICOM Secretariat study of ICT in primary schools

Cousins (2011) is the report of a study commissioned by the CARICOM Secretariat to ascertain the status of the use and integration of ICT in curricula of primary schools of CARICOM Member States.⁵⁸ It presents the findings and analyses responses to a survey and face-to-face interviews.

Findings from Cousins (2011) relevant to Suriname

- High impact roll-out of equipment to primary schools and extensive in-service teacher training that has been provided to primary-level teachers in some Member States have not translated into the hoped wide-scale adoption of ICT integration in the curriculum at the primary level.
- There is strong support for developing a CARICOM regional ICT in Education policy and planning model framework to guide the development of ICT in Education in the region.
- Most primary-level teachers are either at the emerging stage in their practice, where they are becoming aware of ICT and starting to apply the productivity tools in teaching and learning, or at the next level, the applying stage, where they are learning how to use ICT in curricula and are using it to enhance traditional teaching practice.
- At this time, the professional development and ICT tools and resources, provided in the region to teachers and schools, have not translated into more than limited levels of usage and forms of integration in curricula at the primary level.
- Teachers in primary schools with computer labs tend to be unlikely to integrate ICT in the primary school curriculum.
- Initial student-teacher preparation in ICT technical skills and pedagogical competencies to integrate ICT in education need strengthening.
- In-service teacher training, especially if it is led from IT units in ministries of education, has placed emphasis on training in the productivity tools in isolation of pedagogy. Therefore, the training has had minimal impact in advancing ICT integration in curricula.
- At this time, the national primary curriculum in most countries does not factor in the integration of ICT. However, a number of countries report they are at beginning of a curriculum review process and that they will be addressing ICT integration in a new national primary curriculum.
- Few teachers are using ICT tools and resources to develop curriculum-related instructional materials.
- There is limited capacity in the curriculum units of some ministries of education to lead ICT in Education initiatives. (p. 8)⁵⁸

This is not a rosy picture. In fact, the report presents the realities on the ground and gives relevant recommendations for the implementation of national policies in CARICOM Member Countries.

⁵⁸ Cousins, Jackie, The Status of the Use and Integration of ICT in Curriculum in Primary Schools in CARICOM Member States, 2011

3.1.4 ICT development strategy for teachers in Guyana

An ICT professional development strategy for teachers in Guyana was published in 2012 by the Commonwealth of Learning.⁵⁹ According to Guyana's theory of change, if teacher training colleges work with ICT, it will lead to improved teaching and learning. This will also require changes in the national curriculum (towards a more problem-solving orientation) and in pedagogical methods (towards the teacher as a coach). This is based on the UNESCO ICT Competency Framework for Teachers.⁶⁰

The UNESCO ICT Competency Framework for Teachers integrates ICT competencies, pedagogical competencies and content competencies. Guyana will use a digital learning environment (e.g., SuccessMaker: A Digital Learning Curriculum)⁶¹ for ICT management and support at the school level. In terms of content, it will use open education resources (OER) as much as possible, including locally relevant user guides. Partners in this project are the Ministry of Education, the Commonwealth Secretariat, the Commonwealth of Learning and Microsoft. Lessons learned from the Guyana experience could be very relevant to the development of an ICT in Education policy and strategy in Suriname.

Lessons from the Guyana ICT professional development strategy for teachers

"ICT strategy implementation lessons:

- High-level support for the initiative is key for success.
- There is a need for a committee to bring key interests and stakeholders together for successful implementation.
- The UNESCO ICT Competency Framework for Teachers provides an excellent point of reference for the development or refinement of development strategies.
- It cannot be assumed that teacher education providers have the necessary skills to develop, adapt and implement courses aligned with the UNESCO ICT Competency Framework for Teachers.

Materials development lessons:

- Engagement in the process and adoption of the course materials by the lecturers is enhanced if the product meets a real need or requirement.
- Despite current advances in e-Learning, using ICT in increasingly sophisticated ways, the most appropriate use of ICT needs to be assessed in the context in which it will be used.
- Open educational resources (OER) can offer a cost-effective route to acquiring quality teaching and learning materials, especially in environments where resources are in short supply. It is not, however, a shortcut to the normal materials development process. Time, skill and creativity are required to rework the materials to satisfy a specific set of objectives identified by a curriculum committee or body.
- The real benefit of using OER is that once a master version has been fashioned from repurposed resources, it can be legally shared and distributed among a large group at no additional cost. Localized repurposing by those who can and want to adapt it can also be legally endorsed".

A broader description of the Guyana experience can be found in Merodo et al. (2012).⁶² This report highlights some critical points that are also relevant to Suriname.

Critical issues from Guyana relevant to Suriname

- "There are pending challenges in the pedagogical integration of ICT use in elementary and secondary school.
- Schools that have Internet connectivity are exceptions.
- Connectivity is one of the main limitations.
- Problems with teacher academic training and the large number of unqualified practicing teachers become obstacles in the design of the pedagogical use of ICT. This must be understood as a part of the deep cultural change that new technologies represent for children and young people.
- Teacher trainers need to be familiar with ICT and be able to design the training of future teachers from the moment they join the teaching profession.

Nevertheless, Guyana has made progress:

- Implementation of a first stage in incorporating ICT into teacher training has been completed and the second, deepening stage has begun.

⁵⁹ Moore, Andrew (2012), *ICT Professional Development Strategy for Teachers in Guyana*. Vancouver: Commonwealth of Learning

⁶⁰ Hine, Paul (ed.) (2011), UNESCO ICT Competency Framework for Teachers Version 2.0

⁶¹ Pearson (<http://www.pearsonschool.com/index.cfm?locator=PSZk99>)

⁶² Merodo, Alicia et al. (2012), *The Inclusion of ICT in Initial Teacher Training*, OAS

- A number of activities have been articulated simultaneously, including teaching digital literacy to in-service teachers, developing ICT literacy modules and reforming the curriculum for initial teacher training”.

3.1.5 One-Laptop-Per-Family project in Guyana

Another interesting project in Guyana is the One-Laptop-per-Family project. A Government of Guyana (2010) report on the project was subtitled “One Family, One Community, One Internet, One Connected Country”.⁶³

Key features of Guyana’s One Laptop per Family project

“OLPF is about making computers and Internet accessible to Guyanese families so they can propel themselves and the country into the information age. The goal of OLPF is not a computer in every home, the goal is economic development, a competitive workforce and businesses able to transact globally via the ecommerce digital infrastructure... The new optic fiber undersea cable and Brazilian cable will bring Internet access to all Guyanese who choose and can afford to get connected” (p. 9).

OLPF will require project plans to include a means for the computer recipient families to contribute an equal value of their efforts within their community in order to repay Guyanese society for the laptop investment in their family.

The report includes an illustrative table comparing traditional one laptop per child initiatives and Guyana’s one laptop per family project.

Comparison of Traditional OLPC and Guyana OLPF (Government of Guyana, 2010, p. 37)

	One-Laptop- Per-Child	One-Laptop- Per-Family	Advantage
Goal	Teaching/Learning Aid	Economic Development & Technology Adoption	Great Impact on Community
Target Population	Primary School Age	Teen Groups and Community Development Groups	Focus on Projects and Motivated Individuals
Participation	Required	Voluntary Community Lead	Community based solution
Cost of Laptop	Free	Earned through Service	Creates Sense of Value
Hardware	Specialized/Custom Educational	Commercially Available	Greater value across business and education
Primary Network	Student networks	Internet	Communication and Research access
Distribution Center	Schools	Community, Family	Development focus for entire community
Distribution Scale	Large scale through schools	Limited through community based projects	Individual Community Focus
Distribution Approach	Standardized	Customized to community	Flexibility and Innovation
Support	Schools & Government	Community, Commercial & Internet	Job creation and better service
Training	Schools	Community, Schools & Internet	Learning from all sources and collaboration across community and family

In May 2012, the project suffered budget cuts. However, in June 2012 the governments of Guyana and China signed a US \$8 million grant for the supply of 30,000 laptops to the project.⁶⁴

3.2 Latin America

Many studies have been conducted about ICT in Education in Latin America. Many of these are financed by the Inter-American Development Bank (IDB).

3.2.1 ICT in Education in Latin America and the Caribbean

The UNESCO Institute for Statistics (UIS) conducted an analysis of ICT in Education in Latin America and the Caribbean published in 2012. A regional analysis of ICT integration and e-readiness that included Suriname indicates that the country does not score well compared its neighbors in terms of national ICT in Education policy development.⁶⁵

⁶³ Government of Guyana, Project Management Office, Office of Climate Change (2010), *One-Laptop-Per-Family: One Family – One Community – One Internet, One Connected Country*

⁶⁴ <http://new.olpf.gov.gy/> Latest news, 10-09-2013

⁶⁵ ICT in Education in Latin America and the Caribbean, 2012

National ICT in education policy

Formal commitment by government is an important element in the sustainable success of initiatives to introduce and use ICT (Kozma, 2008). Such commitment can take a number of forms:

- a national policy,
- a national plan,
- a set of regulatory provisions,
- a regulatory institution or body.

Thirty-one of 38 countries (82%) in Latin America and the Caribbean have at least one of the abovementioned aspects formally defined in their ICT in Education initiatives, while 9 countries (24%) have formalized all of the elements mentioned above. These 9 are Anguilla, Bahamas, Barbados, Chile, Ecuador, Guatemala, Saint Vincent and the Grenadines, Uruguay and (the Bolivarian Republic of) Venezuela. In contrast, Curaçao, Dominica, Montserrat and Suriname have no formal provisions or regulatory institutions for ICT in Education (Kozma, 2008, p. 7).

3.2.2 One-to-One Laptop

Severin and Capota (2011) produced an overview of "One-to-One Laptop" programs in Latin America and the Caribbean.⁶⁶ The key remark in the report is that learning interventions, such as the introduction of ICT in Education, must be multifaceted in nature.

Key remark of Severin and Capota (2011) on ICT in Education

"There is no silver bullet in education; in this sense, technology is no different from other learning interventions. To achieve educational, social and economic progress, factors other than the sole distribution of laptops must be considered". (p. 4)

Cristia et al. (2012) produced a report for the IDB on the implementation of the One Laptop per Child project in Peru.⁶⁷

Research findings on Peru's One Laptop per Child project

"Although many countries are aggressively implementing the One Laptop per Child (OLPC) program, there is a lack of empirical evidence on its effects. Cristia et al. (2012) paper presents the impact of the first large-scale randomized evaluation of the OLPC program, using data collected after 15 months of implementation in 319 primary schools in rural Peru. The results indicate that the program increased the ratio of computers per student from 0.12 to 1.18 in treatment schools. This expansion in access translated into substantial increases in use both at school and at home. No evidence is found of effects on enrollment and test scores in math and language. Some positive effects are found, however, in general cognitive skills". (p. 1)

In Peru some 900,000 laptops were distributed. Cristia et al. (2012) makes a number of recommendations for increasing benefits.

Recommendations for improving Peru's One Laptop per Child project

- "Use adaptive software aligned with the math and language curriculum.
- An option for governments seeking to implement similar programs is to develop their own pedagogical integration of laptops into classrooms, combining specific software with a strong component of teacher professional development". (p. 19)

A warning is also issued in the report concerning the high capital investment involved in computer hardware.

Warning on setting public investment priorities

"Governments should consider alternative uses of public funds before implementing large-scale technology in education programs. In particular, in poor countries where teachers' salaries are low, the opportunity costs of implementing (capital-intensive) technology programs may be substantial compared with alternative labor-intensive education interventions, including reductions in class size and professional development". (p. 20)

⁶⁶ Severin, Eugenio and Christine Capota (2011), *One-to-One Laptop Programs in Latin America and the Caribbean*, IDB

⁶⁷ Cristia, J.P. et al. (2012), *Technology and Child Development: Evidence from the One Laptop per Child Program*, IADB

Uruguay, too, implemented a large-scale One Laptop per Child program. A blog entry by Michael Trucano recommended, "A fascinating new report commissioned and recently released by Plan Ceibal to help chart the way forward for the project.

"Ceibal: Next Steps",⁶⁸ provides very useful short summaries of the first two phases of the pioneering Uruguayan initiative before offering four concrete recommendations to help guide the project as it enters its 'third phase' of activity, which Fullan and company have labeled 'focused implementation'.⁶⁹

The report referred to in that blog, Fullan et al. (2013), gives recommendations for phase three of Uruguay's project that could be very relevant for Suriname. However, the report does not answer the question of why it is so difficult to integrate ICT, pedagogy and content to really change and improve teaching and learning.

Recommendations for phase three of Uruguay's project

- "Link digital teaching and learning resources on the platform with the curriculum expectations. (p. 14)
- Focus on a small number of ambitious goals as core priorities.
- Focus on literacy (in both Spanish and English).
- Focus on mathematics.
- Reduce grade repetition. (p. 17)
- Establish a user-friendly digital data system that provides, to schools and teachers, ongoing, timely assessments of student learning according to the priorities". (p. 17)

3.2.3 Satellite and mobile broadband

USAID Forward's "Progress Report 2013" gives an interesting example of a successful e-Education project.⁷⁰

An e-Education success story from Colombia

In Colombia, USAID pulled together businesses and government offices to form a \$1 million partnership supporting Internet connectivity and solar energy in 26 schools in the conflict-torn region of Nudo de Paramillo. NewCom, a global communications company, established Internet connections to schools via satellite and mobile broadband; Hybertech, a Colombian technology company, installed solar panels; and Ecopetrol, a Colombian petroleum company, provided schools with computers for connection and refrigerators to store basic vaccines. As a result, 4,200 students are now attending schools with electricity and up-to-date technology. After hours, the schools function as job training facilities for community members. Best of all, USAID's support is phasing out in March 2013 as the Colombian Ministry of Education is poised to continue the project. (p. 17)

3.2.4 Development Connections

A book authored by IDB and Alberto Chong, "Development Connections: Unveiling the Impact of New Information Technologies", takes stock of recent advances in ICT.⁷¹ One chapter deals with ICT in schools, under the subtitle, "Why Governments Should Do Their Homework". Some of the findings are relevant for Suriname.

Lessons from "Development Connections" (IDB and Chong, 2011)

"It is important to measure the total cost of ownership of computers in schools. Investments are more than hardware cost. The regional average Total Cost of Ownership (TCO) of One Laptop per Child (LPC) is \$94. If this includes specially developed educational software, it increases to \$217. Use of a computer lab, with 2 hours allocated per student, costs only \$23.

Some findings:

- The number of PCs per students is irrelevant. A better indicator is minutes of computer time weekly per student.
- There is no clear evidence that ICT in Education motivates students more, improves learning results or reduces the number of dropouts. In some cases, there are negative aspects: less interest in homework, and more time spent playing computer games.
- Increasing students' ICT skills seems to improve job chances although no clear evidence can be given.
- A good practice to improve learning efficiency is computer-aided instruction. Teaching of languages and math especially shows clearly improved results.

⁶⁸ Michael Fullan, Nancy Watson and Stephen Anderson (2013), *CEIBAL: NEXT STEPS*, MichaelFullan Enterprises

⁶⁹ <https://blogs.worldbank.org/team/michael-trucano> 22-03-2013

⁷⁰ USAID (2013) *USAID Forward, Progress Report*

⁷¹ IDB and Chong, Alberto (2011), *Development Connections: Unveiling the Impact of New Information Technologies*. Palgrave, MacMillan

Some recommendations:

- Learn by doing, evaluate what you are doing.
- Aim for evolutionary, not revolutionary (take small steps).
- Include all inputs, not only hardware.
- Focus first on applications that seem to work well, such as basic ICT skills and computer-aided instruction.
- Define policy indicators in terms of use not access.
- Scale is important in dedicated software applications.
- Use ICT also in monitoring.
- Stimulate collaboration between countries and the development of public goods and services".

3.2.5 Computers to Educate initiative in Colombia

In 2000, the Government of Colombia started the Computers to Educate initiative. It is a non-profit partnership involving the Office of the President, the Ministry of Information and Communication Technologies, the Ministry of National Education, the Fund for Information Technologies and Communications and the National Learning Service (SENA).⁷²

Lessons from Colombia's Computers to Educate initiative

"Computers to Educate finances its operation via the Fund for Information Technologies and Communications. This fund is financed by telecom operators, which pay for the use of networks and telecommunication services. It has independent legal personality and assets. Computers to Educate is audited by the Office of the General Controller of the Republic.

Access to ICT. Between 2002 and 2012, Colombia's computer-to-student ratio was reduced from 142 students per computer to only 12. In 2001, the first computers were delivered, in 2011, the first laptops arrived and in 2012 the first tablet computers. Colombia calls this its "digital native strategy".

The Ministry of Information and Communication Technologies in Colombia plays a number of roles:

- helping regions to take advantage of the resources of the National System of Royalties through science and technology Projects,
- coordinating with the municipalities and departments to help regions incorporate ICT in their local development plans,
- providing inclusive attention to the regions (incorporating ICT access as well as teacher training and connectivity),
- optimizing public budgets, saving money and effort by hiring several services through a central project bidding process,
- achieving outstanding impact as an ICT ministry overall.

The initiative carries out two key tasks in appropriation of ICT:

- training of teachers in digital citizenship,
- training parents in ICT literacy.

The focuses in relation to ICT and the environment are as follows:

- a well-defined e-waste policy,
- safe demolition of e-waste,
- job creation in e-waste.

Evaluation of initial results provided a number of figures:

- 4% reduction in drop-outs,
- 2.1% higher scores by children,
- 2.7% more children proceed to a higher education level,
- 4% additional income.

Challenges are noted as well:

- Cooperation is a challenge, including with the local and regional governments, in order to get extra funds from them to guarantee accomplishment current larger goals in Colombia.
- Branding is another issue, as the initiative must demonstrate its impact, achievements, work, compromises and goals, in order to receive funds, technical assistance and donations of new technology.
- Convergence is a challenge, referring to expansion of e-waste management and handling connectivity among the recipient schools.
- R+D+i ("research", "development" plus "innovation") will be the next step for the Computers to Educate initiative, in its aim to keep moving forward, to make the best use of technology in education, and to achieve continually improved and larger outcomes".

⁷² From a presentation by Ruiz Arteaga and Juan Carlos (May, 2013), *Computers to Educate: A Road to Knowledge*

The case of Colombia could be a good example for Suriname to learn from, especially its establishment of a telecom investment fund to finance part of the large investments needed.

3.2.6 Policy dimensions of ICT in education

Hinostroza and Labbé (2011) developed a policy framework for Latin America,⁷³ which could provide a valuable structure for Suriname.

Aspects of Latin American policy framework relevant to Suriname

"Most ICT in Education policies focus on the teaching-learning process and on school management, as well as development of ICT competencies among students and teachers. Surveys also reveal a correlation between each country's specific objectives and the implementing actions it takes. Most countries consistently include ICT competency goals in their curricula, particularly at the secondary level. But few employ systems for evaluating policy implementation. Furthermore, despite the fact that increased student learning and improved coverage and student retention have been defined as priorities for the region, half of the countries do not consider these as explicit goals.

As for findings on policy implementation, most countries have made progress in providing computers. Only 31% of the educational establishments in this group have 5 or more computers; 36% have Internet access and 42% receive some form of technical support. It is estimated that only 42% of the establishments receive digital educational resources through the ministry of education.

Only slightly more than one third of teachers and students in the region have been trained in ICT use (36% and 38%, respectively). In terms of ICT infrastructure usage, the countries report that their computer labs are being utilized at 50% of their capacity, on average.

Looking at policy definition and implementation rates, most countries have made greater gains in the former than in the latter. This suggests the need for funding and/or installed capacity to implement the policies.

Last, bearing in mind the exploratory nature of this study, the findings show a clear lack of records on the implementation of such policies, presenting the countries of the region with an opportunity to develop in this area. The findings can serve to inform the design and implementation of policies for ICT in education".
(p. 8)

Other relevant findings from Hinostroza and Labbé (2011)

"Organizational requirements for implementing ICT in Education initiatives:

- formal policies,
- an ICT (or technology) unit in the ministry of education,
- a curriculum development unit in the ministry of education,
- a unit for professional development of teachers in the ministry of education,
- an educational achievement assessment unit in the ministry of education,

Requirements within universities and/or institutions of higher education:

- foundations or NGOs (separate from ministry of education),
- private institutions.

(p. 47)

Actions needed to implement ICT in Education policies in each country:

- providing computers to schools,
- providing computers to students,
- providing computers to teachers,
- Internet connections in schools,
- training teachers in ICT use,
- training students in ICT use,
- integration of ICTs in initial teacher training,
- technical support at schools,
- digital educational software provided directly to schools,
- assessment of outcomes or impacts.

(p. 55)

Specific objectives that should be included in policies for ICT in Education in each country:

- enhance student learning,

⁷³ Hinostroza, J. Enrique and Christian Labbé (2011), *Policies and practices for the use of ICTs in education in Latin America and the Caribbean*, ECLAC

- develop student competencies in ICT use,
- develop cognitive aspects (motivation, self-esteem, etc.),
- professional development of teachers,
- innovate and/or change in teaching-learning practices,
- improve school management,
- improve management in ministry of education,
- improve educational coverage”.

(p. 56)

3.2.7 Mobile learning

Hinostroza and Labbé (2011) mentioned mobile only once. Jara (2012) published for UNESCO a report on the use of mobile technologies in education, entitled, “Mobile Learning for Teachers in Latin America”. According to Jara, mobile learning has potential, but it is at an early stage of development. The report identifies 18 initiatives, only 3 of which use a planned approach on a large scale.

Two BridgeIT projects give teachers access to download supporting videos for in-class use. A mobile phone can be connected to a projector to show the video to students. The third project, EMIA-SMILE, provides students with mobile phones for enquiry-based learning. Via a laptop, the teacher can monitor interactions between students and the results of assignments.

Mobile learning has not yet lived up the high expectations for it to transform teaching. Costs are still prohibitive, and Internet connectivity at schools is low. Teachers’ attention is focused on the use of technology, not changed didactics.

In that same UNESCO series, another report, “Turning on Mobile Learning in Latin America: Illustrative Initiatives and Policy Implications” (Lugo and Schurmann, 2012) provides additional useful commentary about mobile learning.

Relevant commentary on mobile learning in Latin America

“While the use of mobile phones is growing rapidly in Latin America, mobile learning initiatives are still in the early stages of development. Most programs are pilot projects, driven by non-profit organizations or universities typically targeting small groups and focusing on particular and often local needs.

At the policy level, mobile learning is still in its infancy. Restrictions on the use of mobile phones in schools are still widely imposed through government or institutional rules, though this situation is changing in some countries. Despite the fact that mobile phone use has grown enormously in the last decade, and that the number of Internet users continues to grow steadily, the region’s telecommunications infrastructure is extremely limited. Broadband access, both fixed and mobile, is still scarce and expensive for large segments of the population.

Nevertheless, mobile learning holds considerable potential in the region. In particular, educators and policy makers have shown interest in exploring how mobile technologies can be used to address key educational issues such as literacy, educational access and retention”.

(p. 7)

For Suriname, two developments could be of interest: the use of smartphones by inspectors, like in a project in Argentina where inspectors have access to an education management information system at the school level and in Paraguay where mobile phones are used to do standardized exams. Both are still pilots. Evaluation research has not yet been conducted.

3.3 USA

Education in the USA shows an incredible variety. Districts and states have their own education policy. The role of the federal government has increased in recent years, however, which has enhanced uniformity.

Despite many federal initiatives (e.g., the No Child Left Behind program), the quality of education is stratified. Rich kids have high-quality schools, with the best education content and teachers. Kids from low social backgrounds attend schools of much lower quality.

There are many success stories about small-scale e-Education projects. At the federal level, the question has been raised of why investments have not led to reform of the

educational system as a whole. Teachers are seduced, trained and supported to change their methods, but many traditional teaching approaches are still used and no clear evidence of measurable results of ICT investments are available.

3.3.1 Digital Promise League of Innovative Schools

The Digital Promise League of Innovative Schools is typical of the many small-scale, local initiatives in the USA.⁷⁴ According to the League's website, it is "a national coalition of 40 school districts in 24 states, serving 3 million students". The League observes 4 main problems that its strategic initiatives aim to solve.⁷⁵

Four main problems identified by the Digital Promise League

- "A fractured market and outdated regulations make it difficult for developers to sell – and educators to buy – the innovative tools that students need.
- Too often, educators do not know how to implement and scale up proven innovations.
- When it comes to digital innovation in education, we often do not know what works for which students under what circumstances.
- Too often, barriers between entrepreneurs and educators make it hard for educators to find resources that work, and also make it hard for entrepreneurs to know what educators need".

One of the most interesting and practical solutions is DOCENT,⁷⁶ the League's Digital Online Curriculum Evaluation Network, presented in a single, cloud-hosted environment.

Facilities in DOCENT for teachers

- "Make available innovative new digital learning tools to League members.
- Host these tools in a single online environment so that any software provider can easily provide them and any League member can easily use them.
- Incorporate evaluation hooks and data collection that League researchers can use to help evaluate the success of these digital tools.
- Allow for scaling up of any tool into production through this hosted environment.
- Allow the buying power of all League members to be utilized in licensing these hosted tools".

3.3.2 Project RED

In 2010, Project RED published an analysis of successful digital education and preconditions for its success. The project was financed by the e-Learning industry.

Hypotheses on e-Learning

"Three hypotheses⁷⁷ on e-Learning were tested by Project RED:

- Properly implemented educational technology can substantially improve student achievement.
- Properly implemented educational technology can be revenue- positive at all levels – federal, state and local.
- Continuous access to a computing device for every student leads to increased academic achievement and financial benefits, especially when technology is properly implemented.

Project RED analyses support for these hypotheses. The insights gained through the project will prove valuable to any school that is planning to implement ubiquitous technology".

Project RED identified 9 key implementation factors that it views as most strongly linked to success measures for education.

Key e-Learning implementation factors according to Project RED

- "Intervention classes: Technology is integrated into every intervention class period.
- Change management leadership by principal: Leaders provide time for teacher professional learning and collaboration at least monthly.
- Online collaboration: Students use technology daily for online collaboration (games/simulations and social media).
- Core subjects: Technology is integrated into core curriculum.
- Online formative assessments: Assessments are done at least weekly.
- Student-computer ratio: Lower ratios improve outcomes.
- Virtual field trips: With more frequent use, virtual trips are more powerful, with the best schools doing these at least monthly.
- Search engines: Students use them daily.
- Principal training: Principals are trained in teacher buy-in, best practices, and technology-transformed learning".

⁷⁴ www.digitalpromise.org/initiatives/league-of-innovative-schools/

⁷⁵ Annual report 2012 Digital Promises, p. 5

⁷⁶ Digital Online Curriculum Evaluation Network (DOCENT) Overview, n.d. p. 1

⁷⁷ The Technology Factor, n.d., p. 2

3.3.3 Initiatives of the US Department of Education

The Transforming Education through Technology Act was put forward in 2013 by US Congressperson George Miller of California.⁷⁸

Elements of the Transforming Education through Technology Act

- "Support teachers and principals in using technology to increase college and career readiness, close achievement gaps, and engage all students.
- Help school districts build a technology infrastructure to make sure schools take full advantage of what technology has to offer.
- Help states improve student learning, upgrade assessments, and improve educator preparation and support.
- Seed innovation to create the learning environment of tomorrow using the best technology of today.

The Act will provide US \$750 million a year for a period of 5 years to support the Act's implementation".

3.4 Asia

3.4.1 ICT in Education in Central and West Asia

The 2012 report "ICT in Education in Central and West Asia", supported by the Asian Development Bank (ADB),⁷⁹ offers a comparison of developed and developing countries in Asia. Some of the findings are relevant for Suriname.

Key findings from "ICT in Education in Central and West Asia"

"Much of the evidence cited on the beneficial impact of ICT on education outcomes is based on largely subjective assessments of student attitudes and behavior. Thus, ICT is often claimed to be popular with students and welcomed by parents. There are claims that school attendance has improved because there are computers in schools. ICT use is also claimed to have changed teacher-pupil working relationships and teaching-learning dynamics in the classroom. Many proponents of ICT in schools – particularly hardware companies selling computers – use such non-specific, unproven arguments to support more computers in schools, even though it is clear that many schools cannot cope with what they already have. This is almost certainly true in developed countries with high levels of ICT investment and use. But it is less certain in many developing and transitional economies, where equipment and facilities are poorer, ICT-trained and motivated teachers are fewer, and access to and use of the hardware and software is more constrained. There is less current evidence of the impact on student performance; it is even scarce in basic learning areas such as literacy and numeracy. A large part of the problem of impact assessment arises from the difficulty of isolating the impact of ICT on learning outcomes from the large number of other potential factors".

(p. 8)

Recommendations in the report describe the essential support services that should be made available to schools and teachers.

Essential support services for schools and teachers

"Two overriding requirements are essential for any country to achieve effective ICT use in its school system:

1. a national ICT for education development strategy that takes into full account all of the policy strands listed above, and
2. realistic assessment of the costs involved in any strategy.

Essential support services for schools and teachers are at minimum the following:

- the financial support of adequate operational budgets at the school level to support the hardware provided;
- teacher training, both pre-service and in-service, to ensure that all teachers have sufficient ICT skills and confidence and a genuine operational grasp of the possibilities for ICT use in the classroom;
- reliable power supply;
- connectivity to the Internet;
- access to good, professional and affordable maintenance and support services;
- a curriculum and subject syllabuses that clearly define the roles and possibilities of ICT at different levels and in different subjects, and a framework for syllabus space and time to gradually develop ICT as a subject and as a teaching and learning tool in other subjects;
- an assessment system that recognizes and identifies the required ICT-based skills and outcomes and knows how to measure them;

⁷⁸ [http://democrats.edworkforce.house.gov/bill/transforming-education-through-technology-act \(11-04-2013\)](http://democrats.edworkforce.house.gov/bill/transforming-education-through-technology-act (11-04-2013))

⁷⁹ ICT in Education in Central and West Asia Executive Summary, Asian Development Bank, 2012

- appropriate software and educational learning environments that provide the right kind of teacher and user-friendly e-materials in local languages; and
 - clear guidelines for the effective management of ICT in schools".
- (p. 12)

3.4.2 Asia-Pacific Ministerial Forum on ICT in Education

The 2012 Asia-Pacific Ministerial Forum on ICT in Education (AMFIE) was themed "The Power of ICT in Education Policies: Implications for Educational Practices". The executive summary of the forum highlights three focal areas of relevance for Suriname.⁸⁰

Three focal themes of ICT in Education

"1. ICT in Education as a means to reduce societal inequities: By focusing ICT in Education policies for underserved populations, governments can begin to bridge the "digital divide" that restricts the opportunities for underprivileged and rural students. However, the provision of technology alone will not facilitate the deep structural changes necessary to achieve the EFA goals.

2. Translation of ICT in Education policies into action: The spread of ICTs and the expansion of educational opportunities have similar power to transform societies. Uniting these forces in a coherent plan can place a nation on the path to "knowledge creation" and introduce the possibility for perpetual innovation to solve pressing global problems. Extending the discussion of ICT in Education to a broad-ranging societal transformation is key to involving actors beyond ministries of education, and thus ensure greater success of initiatives.

3. Training, supporting, and evaluating teachers for ICT in Education: The central place of teachers in the education process is accepted globally. Therefore, a consistent theme of AMFIE 2012 was the need for specific policies and projects targeting teacher competencies in the digital age. Teachers need to be both digital workers and digital learners, utilizing the full range of tools at their disposal in the internet age".
(Leighton, 2012, p. 1)

"Why do most ICT policies go nowhere?"

"This provocative question was raised during Dr Robert Kozma's keynote address at AMFIE 2012. Technology has changed the structure, goals, processes and outputs of economies around the world. However, despite the widespread development of ICT in Education policies, most systems of classroom organization, student assessment, student activities and teacher professional development look the same as they did at the beginning of the twentieth century.

Kozma suggested the following steps for a successful ICT in Education policy:⁸¹

- Formulate a vision of society in the future. Include the skills that you wish citizens to have. Consider how you want technology to enrich schools and classrooms in the future.
- Create a long-term plan with a defined trajectory to achieve your vision. Consider a series of cascading five-year plans and short-term projects that work towards the final goal.
- Build alignment both within and between agencies. All departments within the Ministry of Education need to collaborate, as do all government Ministries.
- Use ICT as a lever for complementary changes to the education system. Consider altering mechanisms for professional development, student assessment, and school organization.
- Provide resources and find partners. Consider teaming with non-governmental actors, civil society organizations, and industry leaders;
- Conduct evaluations and revise your plans accordingly. Ensure that you have the mindset and flexibility to make necessary changes".

3.5 Africa

3.5.1 GESCI en ALICT

The Global e-Schools and Communities Initiative (GESCI) is an international non-profit technical assistance effort headquartered in Nairobi, Kenya. GESCI was founded by the UN ICT Task Force in 2004. Its mandate is to transform education and training systems through holistic technology integration for socio-economic development.

⁸⁰ Leighton, Seth, et al. (2012), *Asia Pacific Ministerial Forum on ICT in Education 2012, Outcome Document*

⁸¹ Leighton et al., 2012, p. 9

The African Leadership in ICT Course (ALICT) is an initiative of the African Union Commission, supported by the Ministry for Foreign Affairs of Finland and implemented by GESCI. In 2011, research was conducted to measure the results of ALICT.⁸²

Evaluation findings on the African Leadership in ICT Course

"GESCI (2011) presented a general recommendation to develop leadership for integrating ICT in Education. Swarts (2012) reviewed the ALICT program and provided some relevant recommendations:⁸³

- Promote policy coherence. Policy has to be embedded in schooling culture for the better management of schools and distributed school leadership.
- Promote curriculum reform. Equip students with the capacity to learn and apply new skills throughout their lives – skills such as critical thinking, creativity, communication, user orientation and teamwork.
- Promote ICT integration in education. Open and distance education policies should be designed to promote lifelong learning of teachers and learners. Digital media should enable outreach to even the most remote parts of a country to address the economic divide and barriers hindering information access. Sufficient ICT infrastructure and broadband internet access need to be built in schools and colleges.
- Promote lifelong learning. Ensure the development of metacognitive and lifelong learning skills that meet the demands of new knowledge-intensive economies.
- Promote a workplace learning model. The focus of educational programs should be on student performance to develop diverse perspectives and approaches to problem solving, critical thinking skills, and the ability to work effectively in teams and to establish a pattern of continued learning in and out of the workplace.
- Develop a new qualifications framework model.
- Promote a multi-stakeholder model of education. Promulgate new modalities for education provision based on a public-private partnership model in order to take industry perspectives into account when developing curricula.
- Develop new funding models. ICT investment should not be one-off. Rapid obsolescence of equipment demands massive recurrent investment to sustain initiatives".

Another GESCI publication is "Education Change, Leadership and the Knowledge Society" (Gaible, 2010). It compares Rwanda and Singapore, presenting some interesting findings.

Findings from a comparative study of Rwanda and Singapore

- "School-level challenges. The use of ICT as an "engine" of change requires high levels of student access and teacher capacity. Such levels are difficult to achieve in one rural school, let alone an entire system. Recent research suggests that given limited computers in schools, only 50 percent of students use computers one hour or more per week, and computer resources are largely used to learn basic ICT skills. They have limited impact on teaching or learning in other subjects.
- Government-level challenges. Efforts to address the hardware gap via partnership with the One Laptop per Child organization have stalled, in part due to the estimated expense of procuring, delivering and maintaining the organization's low-cost Children's XO laptops.
- Infrastructural challenges. Broad economic and social factors, such as Rwanda's low level of ICT penetration and chronically inadequate infrastructure, limit impact on schools and the school system. As of 2006-2007, only 7% of the population had used the Internet, and 71% had never heard of it; there were four personal computers for every thousand people. Lack of experience of computers and the Internet increases the burden on in-service professional development and learning-resource development. These challenges are intensified by chronically inadequate grid-based electricity.

Education change, in every case, is slow, and it is only one part of the process of economic development. It is too soon to guess how Rwanda's comprehensive effort will turn out".

The investment levels of Rwanda and Singapore are incomparable, but Gaible (2010, p. 19) was able to present several recommendations that could be valuable for other developing countries:

- Invest consistently.
- Sync policy, the public and practice.
- Commit to inclusivity.
- Integrate teaching practices, learning objectives and content.
- Link the outcomes of change to policy goals.
- Focus on changing practice, not on technology.

⁸² GESCI (2011), 'African Leadership in ICT: Assessment of Environmental, Institutional and Individual Leadership Capacity Needs for the Knowledge Society in Africa: A Situational and Needs Analysis in Four Countries Mauritius, South Africa, Tanzania, Zambia'

⁸³ Swarts, Patti (2012), Education 8 Policy Recommendations For the advancement of Knowledge Societies across Africa. GESCI and ALICT

A very practical publication on the financial side is "Deploying 1:1 Educational Models in Large Scale" (2010).⁸⁴

Guidance on budgeting for ICT in Education

"The exercise of working through a Total Cost of Ownership (TCO) calculation is useful not only for informing budgetary decisions, but also for examining the overall scope and feasibility of a project.

Filling out the spreadsheet can reveal gaps in project planning and unexpected expenditures. Carefully thinking through the recurring costs can help guarantee the project's sustainability and in assigning funds to make sure that these do not arrive unplanned to school headmasters and the communities that host the schools".

3.5.3 Five years of learning on ICT for education

IICD's retrospective study of 5 years of learning about ICT in Education covers 6 African experiences as well as 2 Latin American ones (Bolivia and Peru). The African countries included are Ethiopia, Ghana, Kenya, Malawi, Uganda and Zambia. Findings of the of the study in three areas could be of particular relevance for Suriname (see below).

Elements of IICD's retrospective study that could be of value for Suriname

- "Creating and upgrading educational materials. Schools often lack access to culturally relevant teaching materials. Especially in rural areas, most of the textbooks that are available have been developed abroad without any adaptation to the local situation. This makes it hard for students to understand the content and relate to it. Sometimes parents may doubt the value of sending their children to school, since the skills and knowledge they bring home seem to have little relevance to their daily lives. A primary IICD focus is training teachers to develop their own learning tools using ICT. This approach ensures local ownership and more relevant and usable materials. Alongside teachers' own self-developed materials, there is a growing online availability of learning tools, including books, videos and games. These too can be used to boost motivation and skills, not only of students but of teachers as well. Educational computer games are a great way to get students attention. Many such games are available online, so it is not necessary for schools to reinvent them. However, it is important for teachers to know how to find and select those games that are most appropriate for their situation, including the ICT tools they have available.
- Improving teacher competences. Improving teacher competences to achieve the transformative potential of ICT in combination with pedagogical skills is extremely important. For example, teachers can improve their methods of instruction by using videos for self-assessment, and they can engage their students through interactive games. Training in basic ICT skills and ICT-assisted learning familiarizes teachers with the different types and uses of digital materials. Training is equally important to introduce ways of integrating ICT into the classroom didactics, so that newly acquired skills can be immediately applied. Teachers are often hesitant to display their (lack of) technology skills in front of pupils. Introduction of ICT in schools has led to intensified collaboration among teachers. Developing learning tools together provokes discussions about teaching strategies and methods.
- Integrating ICT into policy and strategy. A multi-stakeholder approach linking policy makers, NGOs, teacher training colleges, schools and local communities is extremely important in developing successful ICT in education policies. The sensitization of decision makers is an essential step that cannot be overlooked. However, it has its limits if other interests turn out to be stronger. In the end, an enabling environment has to be in place for ICT to be of sustained added value for education".

(pp. 6, 7 and 10)

3.5.3 E-Learning Africa Report 2013

Each year the annual conference on e-Learning initiatives in Africa publishes a reports on that year's theme and presentations. The 2013 theme was "Tradition, Change and Innovation". The 2013 report underlines the difficult challenges involved in providing equitable and quality access to education for all, combined with the new learning spaces that digital technologies open up.

A key finding of the 2013 e-Learning Africa conference report

"There continues to be a divide of views and insights among education practitioners. Traditionalist practitioners – those without access to new learning technologies – tend to be primarily focused, due to their personal views or circumstances, on delivering the basics of education: chalk, textbooks, qualified teachers and functional classrooms. Conversations about innovation still seem to be taking place in parallel with resolving our traditional educational

⁸⁴ Bassi, Roxana (2010), *Deploying 1:1 educational models in large scale: A practical budgeting tool based on TCO*, GESCI

problems. There is an urgent need to establish points of connection between these conversations". (p. 9)

3.6 Europe

3.6.1 European Commission

The European Commission's "Education and Training Monitor 2012" analyses the current situation in Europe. Two indicators emerge as key in assessing ICT in Education:

- the percentage of pupils in 4th grade using computers at school, and
- the percentage of individuals aged 16-74 with advanced computer skills. (p. 6)

The report also presents some challenges regarding ICT in Education (see below).

Challenges of ICT in Education noted by the European Commission

"Teachers and school heads are positive about the wider learning potential of ICT and its essential role in teaching and learning for pupils in the 21st century. Furthermore, infrastructural barriers to the use of ICT in education have been reduced over the last 5 years. Still, data from 2011 reveal that although online resources and networks are now widely available in Europe and the majority of teachers are now familiar with ICT at school, they still use it first and foremost to prepare their classes, and digital resources of all types are still used far too rarely during lessons.

Teacher participation in training on how to use ICT for teaching and learning is seldom compulsory. This and other findings suggest that there should be a strong focus on measures, particularly training, to support and develop teachers' ICT competence and ICT use in the classroom. Moreover, central regulations in most European countries require teachers' ICT skills to be strengthened". (p. 38)

ICT in Education is also mentioned in the European Commission's "Digital Agenda".

Europe's Digital Agenda

"Mainstreaming e-Learning in national policies is one of the key actions of the Digital Agenda for Europe. Making full use of ICT in education and training in Europe is a necessity to effectively modernize education, for all subjects and skills. It also contributes to the innovation potential of Europe, which in turn is crucial for competitiveness and for addressing social challenges. E-Learning is no longer seen as a tool for instruction but as a policy instrument, a paradigm for change in education and training".

The European Schoolnet and the University of Liege conducted a survey of schools in Europe to analyze the current situation.⁸⁵ The survey results point to the need for a number of policy actions at all levels of the system to ensure optimal use of increasingly tight financial resources.

Policy actions recommended for effective ICT resource use

- "In general terms, survey findings make a case for strengthening public action at the institutional, local, regional, national and European levels to boost ICT use in schools so as to reduce the gap between ICT use within and outside of schools.
- Positive attitudes and sufficiency in ICT provision should be transformed into effective and sustained classroom practice. Evidence shows also that increasing professional development opportunities for teachers is an efficient way to boost ICT use in teaching and learning since it helps build highly confident and positive teachers.
- Despite having access and positive attitudes towards implementing ICT into their teaching and learning, teachers often find this difficult and require ongoing support – not only technical but also pedagogical.
- The high levels of use of personally owned mobile phones should be harnessed".

3.7 Flanders and the Netherlands

Flanders and the Netherlands are described in this separate section because they share with Suriname the use of the Dutch language in the education system. Good practices could therefore be particularly valuable for the situation in Suriname.

3.7.1 Flanders

The Flemish Education Council (*Vlaamse Onderwijsraad*) recently published a policy document about ICT integration in education. It is a follow-up to a policy document that

⁸⁵ *Survey of Schools: ICT in Education, Benchmarking Access, Use and Attitudes to Technology in Europe's Schools.*

presented a strategy for 2009-2014. It mentions specific activities to be implemented as follows:

- "additional bandwidth at schools for fast Internet connectivity,
- a more focused ICT infrastructure program
- agreements with Internet providers, software and service providers to negotiate affordable fees for education institutes,
- stimulation of open source software in education.

In addition, a 2012-2013 policy brief advises taking the following actions:

- developing a testing method for searching for information,
- redesigning the ICT monitor,
- establishing a serious gaming fund for educational purposes,
- participating in the international "e-Safety Label" pilot,
- facilitating knowledge sharing between schools that use tablets,
- compiling good practices on use of social media in tertiary education, and
- supporting the "School of the Future" project of the Flemish Agency for Innovation by Science and Technology".

Furthermore, the policy brief presents a concise overview of conditions required for successful ICT integration in education. It uses a strategy development model, called the Four in Balance Model (*Vier-in-balans-plusmodel*) developed by the Dutch foundation Kennisnet.⁸⁶ The model sets out 4 elements that are all necessary but need to be adequately balanced:

- vision development at the national and the school level integrated into an overall vision on education,
- digital educational content (collaboration with educational publishers will be necessary),
- integrated competences for teachers (including ICT, pedagogy and content skills), and
- ICT infrastructure (based on schools needs).

Each of the elements is important, as is the balance between them. Together they form preconditions for successful ICT integration in education. They should, furthermore, be combined with strong leadership and collaboration between stakeholders.

3.7.2 The Netherlands

There is a long list of institutes in the Netherlands that have worked in the area of ICT in Education in the past 30 years. There have been many policy changes over this period as well, and different ways of financing and organizing ICT in Education.

Kennisnet

In the Netherlands, an independent institute was established in 2001 by organizations from primary- and secondary-level education (including higher-level vocational schools). The objective of the new institute was "to supply high-quality and relevant educational content". That same year, another foundation, called "ICT at school" (*ICT op School*), was established by the education sector. This was to transmit to suppliers schools' needs and questions about products and services in ICT in Education and to stimulate collaboration. In 2006, the two organizations merged. In recent years, the focus has changed to supporting schools in ICT in Education.

Recently, Kennisnet published the "Four in Balance Monitor 2013".⁸⁷ Current Kennisnet themes, according to its website (<http://innovatie.kennisnet.nl>), are flipping the classroom, use of social media in education, media literacy, use of digiboards, laptops versus tablets, the virtual learning environment, parental involvement, ICT and math, ICT and language, ICT competences for teachers, use of augmented reality and "gamification".

It could be useful for Suriname to collaborate with Kennisnet to set up a similar portal with relevant content for the Suriname context.

Other relevant organizations in the Netherlands

⁸⁶ www.kennisnet.nl/onderzoek/vier-in-balans-monitor/

⁸⁷ <http://www.kennisnet.nl/onderzoek/vier-in-balans-monitor/>

The table below presents an overview of key players in ICT in Education in the Netherlands. The list is not exhaustive, but nonetheless shows many of the initiatives in e-Education.

Key players in ICT in Education in the Netherlands

Areas	Organizations (Dutch names are used)
General education advice and policy	Onderwijsraad Sociaal Cultureel Planbureau Koninklijke Nederlandse Akademie van Wetenschappen
Content platform	Kennisnet
Needs assessment	Schoolinfo, saMBO-ICT
Strengthening education information chain	Samenwerkingsplatform Informatie Onderwijs
Software licenses	APS-IT diensten samen met SURFmarket en SLBdiensten
Innovative teaching methods	Sterrenschoon, Netwerkschoon, Onderwijs voor een nieuwe Tijd, iPadschoon, Innovatieimpuls Onderwijs (vb)
Research	Vereniging Onderwijs Research (de VOR), divisie ICT, universiteiten, hogescholen. Ook speciale hoogleraren en lectoren.
Innovative start-ups	WAAG Society, Eduapp, StudyFlow, Simulise, Rekentuun, PulseOn, Khan Academy NL, Joyrite (vb)
Foundations	Vakvereniging i&i
ICT congresses	NCOSM, Nationaal Congres Onderwijs & Sociale Media IPON, Innovatie Platform Onderwijs, Dé Conferentie voor Onderwijsvernieuwing en ICT, Dé Conferentie voor Onderwijsvernieuwing en ICT
Curriculum development and ICT	SLO
Journals	ICT & Didactiek, VIVES, COS
Technical support and advice in ICT in Education	Hogescholen, ICT afdelingen besturen bureaus en administratiekantoren
Bloggers	Wilfred Rubens, Jan Lepeltak
Teacher capacity building	European or International Computer Drivers Licence (ECDL/ICDL)
Virtual learning platforms	its learning, Webskoel (vb)
Social media tools	Klasbord, Mijn schoolinfo (vb)
Administrative software	Parnassys, SchoolMaster (vb)
Open source suppliers/advisers	Stichting VO-content (open leermateriaal)
Advice on mobile educational apps	Eduapp
Assessment advice	Universiteit Utrecht (vb)
Publishers	Malmberg, Thieme Meulenhof, Noordhoff, Zwijsen, Muiswerk Educatief, Ambrasoft
Platform educational TV- and radio content	Teleblik
Unlocking learning materials for talented students	Acadin (met SLO)

3.8 International organizations

3.8.1 UNESCO Bangkok

The "ICT in Education" website of UNESCO Bangkok⁸⁸ is an important source of information in several areas:

- developments in Asia and Pacific on ICT in education,
- overview of ICT in education projects, and
- portal with online resources and events.

The site mentions a number of examples of ICT in Education projects that are relevant for Suriname:

- Facilitating Effective ICT-Pedagogy Integration (2010-2013),
- The Next Generation of Teachers (Next Gen) project (ended in 2011), and
- ICT in Education Teacher Training Modules for Developing Countries: Training and Professional Development of Teachers and Other Facilitators for Effective Use of ICTs in Improving Teaching and Learning.

⁸⁸ www.unescobkk.org/education/ict/

UNESCO Bangkok also developed a policy makers' toolkit for ICT in Education.

UNESCO Bangkok's toolkit for ICT in Education

There are various forms of ICT which can be used in education. Technology should not be equated with only computers and the internet; other ICT such as radio and television can be used to enhance teaching and learning. However, forms of ICT differ in their properties, scope and potential. For example, an audio technology captures sound; video technology depicts sound and motion; a CD provides multimedia digital content in an easily portable form; and a website can have the element of interactivity. Education policy makers and strategists are faced with demands for more and better education.

Recognizing the advantages that ICT can bring in terms of meeting demands for improved education, educational authorities are under pressure to provide every classroom (if not every student) with ICT equipment, including computers and their accessories and connectivity to the Internet.

The pressures to equip schools with ICT are coming from vendors who wish to sell the most advanced technologies, from parents who want to ensure that their children are not left behind in the technological revolution, businesses who want workers with ICT skills, and from those who see ICT as the latest hope to reform education.

Experience is proving, however, that acquiring the technologies themselves, no matter how hard and expensive, may be the easiest and cheapest step in a series of steps towards utilizing these technologies to improve. It is the integration of these technologies into education systems that is proving most difficult.

It is important to remember that technology is only a tool: no technology can fix a bad educational philosophy or compensate for bad practice. In fact, if we are going in the wrong direction, technology will get us there faster. Providing schools with hardware and software does not automatically reform teaching and improve learning. And ICT-enhanced education activities should not be perceived as a substitute for teachers or schools. Much depends on educational practices and how ICT are used to enhance them. Effectively integrating technologies into educational systems is a complicated process. The road from the potential that ICT offers to effective application is a long and sophisticated one that requires deliberate planning, sustained implementation, calculated course modification, and continuous maintenance. This process involves a rigorous analysis of educational objectives; a realistic understanding of the potential benefits that technologies can provide; a purposeful consideration of the pre- and co-requisites for effective ICT use in education; and an awareness of prospects of this integrative process within the dynamics of educational change and reform.

The 6 toolboxes (and 18 tools) in the UNESCO ICT in Education Toolkit⁸⁹

"The UNESCO ICT in Education Toolkit provides education strategists with 6 toolboxes – containing a total of 18 tools – that cover the following areas:

- mapping the present situation in terms of national goals, educational context, ICT in education and the dynamics of change;
- identification of educational areas for ICT intervention and formulation of corresponding ICT-in-Education policies;
- planning for implementation of infrastructure, hardware, and personnel training;
- planning for contentware;
- consolidating implementation plans and their financial and managerial implications into one master plan;
- assessing implementation, effectiveness and impact of ICT interventions and subsequent adjustments and follow-up actions".

The last update was in 2007. Michael Trucano lamented the lack of current updates in a blog dated 11 September 2012: "For many years, we used something called the ICT in Education toolkit for policy makers, planners and practitioners to help facilitate this process; unfortunately this web-based collaborative planning tool is no longer maintained."⁹⁰

3.8.2 The Commonwealth of Learning and open educational resources

The Commonwealth of Learning is an intergovernmental organization created by the Commonwealth Heads of Government to encourage development and sharing of open learning and distance education knowledge, resources and technologies. The Commonwealth of Learning is helping developing nations to improve access to quality

⁸⁹ www.unescobkk.org/education/ict/ict-in-education-projects/policy/toolkit/toolkit-background/

⁹⁰ <http://blogs.worldbank.org/edutech/>

education and training. In education, the Commonwealth of Learning helps countries improve the scope, scale and quality of formal instruction at all levels through the use of learning technologies. It has four main initiatives:

- open schooling (secondary education),
- teacher education ("green teacher", child-friendly schools, dissemination of OER content for teacher education in Africa),
- higher education,
- the Virtual University for Small States of the Commonwealth (VUSSC).

E-Learning (previously one of 8 focus areas) and gender are cross-cutting themes that underpin and complement all of its education activities. E-Learning is the most relevant area for Suriname.

Five e-Learning objectives of Commonwealth of Learning support

- "Develop e-Learning capacity in governments, institutions and communities.
- Maximize economies of scale in both the delivery and management of e-Learning.
- Promote ICT competency among teachers.
- Promote the development and use of open educational resources (OER).
- Provide technical advice on emerging technologies and their implications for learning outcomes".

To heighten attention to OER, the Commonwealth of Learning started a dedicated website, "Taking OER beyond the OER Community".⁹¹

The book "Open Educational Resources: Innovation, Research and Practice" edited by Rory McGreal et al. (2013) makes mention of a Dutch OER initiative called "Wikiwijs".

Wikiwijs

"Wikiwijs" literally translates as "Wikiwise". In a nutshell, this is an open, Internet-based platform where teachers can find, download, (further) develop and share educational resources. The whole project is based on open source software, open content and open standards.

Wikiwijs was designed as an environment in which all teachers in the Netherlands, ranging from primary school teachers to higher education professors, can (co-)develop, share, rework and use digital learning materials published under an open license. On 14 December 2009, the Minister of Education of the Netherlands, Ronald Plasterk, launched the first version of Wikiwijs.

Digital learning materials are more than digital textbooks. The site and community are designed to support a variety of educational materials including tests, labs, simulations and practice materials".

Wikiwijs is an initiative that Suriname could draw upon and transform into a version relevant for its own teachers.

3.8.3 World Bank

InfoDev-EduTech

Michael Trucano is the champion of World Bank activities in the area of ICT in Education. He publishes a blog about ICT in Education. In 2012 a blog entry about ICT in Education policy development was posted,⁹² titled "Analyzing ICT and Education Policies in Developing Countries".

Excerpt from "Analyzing ICT and Education Policies in Developing Countries"

"For the last year or so, we have been collecting policy documents related to ICT use in education from around the world, with a specific interest in trying to document policy intent in developing countries, especially in East Asia. This is one component of a larger initiative at the World Bank called Systems Approach for Better Education Results, or SABER. As part of our SABER-ICT project, we are trying to help policymakers as they attempt to assess and compare their own policies against those of comparator countries around the world. Here's a very real scenario:

⁹¹ <http://oerworkshop.weebly.com/>

⁹² <http://blogs.worldbank.org/edutech/ict-education-policies>

An education minister approaches the World Bank and asks for help in formulating an "ICT in education" policy, in preparation for what is intended to be a large scale investment in educational technologies. She asks us: What might be important to include in such a policy?

While a lot of useful things have been written on this topic, 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 is actually not a lot of rigorously collected, globally comparable data out there.

Rather, it is meant as a reminder that (1) Much of what we do 'know' is based on anecdotal evidence, or 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); (2) Much of what we collectively 'know' is derived from experiences from OECD countries that may or may not be relevant to middle and low income countries (For what it's worth, we do seem to have an increasingly good handle on what doesn't work.)

We readily concede that there is a major limitation in just examining policy documents: They only signal intent, and typically contain little insight into whether a given policy (or policy component) was or is being implemented faithfully, nor do they document what impact (if any) resulted from the implementation of related policy guidance.

Based on our preliminary review of policy documents, we find that most ICT/education policies address the following topics to varying degrees:

1. Vision and planning
2. ICT infrastructure
3. Teachers
4. Skills and competencies
5. Learning resources
6. Education management information systems
7. Monitoring and evaluation, research and "innovation"
8. Equity, inclusion and safety

We have also noted a number of "cross-cutting themes" that regularly appear in a few policies, related to things like distance education/distance learning; "mobile learning"; early childhood development (ECD); open educational resources; community engagement; and data privacy that are on the agenda for certain sub-sets of countries.

Here's a concrete example of what we're talking about:

As part of a policy component that seems to relate to "vision and planning", many countries identify specific institutional arrangements related to the oversight and implementation of ICT/education initiatives. Generally speaking, policies seem to address this issue in four ways by articulating intentions related to having:

- No dedicated group/unit/agency for ICT in education
- A plan to set up a unit/agency on ICT in education (or a very small group exists with this responsibility)
- A dedicated, professionally staffed unit/agency for ICT in education
- 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".

3.8.4 Global Partnership for Education

The Global Partnership for Education is a collaborative multilateral donor initiative. The World Bank is one of the partners, as are UNESCO and UNICEF. In the Global Partnership's "Results for Learning Report 2012", education sector plans are analyzed. ICT ranks 4th place in the topics covered in these plans. It is covered in 35% of the plans.

Key caveat in the "Results for Learning Report 2012"

"One should keep in mind that there can be a large gap between the policies enunciated in plans, norms or bureaucratic circulars and the policies that are actually implemented".
(p. 101)

3.8.5 International Telecommunication Union

The International Telecommunication Union (ITU) is the United Nations' specialized agency for information and communication technologies.

Mission of the UN International Telecommunication Union

"We allocate global radio spectrum and satellite orbits, develop the technical standards that ensure networks and technologies seamlessly interconnect, and strive to improve access to ICTs to underserved communities worldwide".

ITU has clearly expressed its emphasis on education. Many topics are dealt with in its special initiatives newslog, "ICT in Education".⁹³ Broadband is seen as "the missing link" in global access to education.

The Broadband Commission Working Group on Education has made a number of recommendations to governments and other stakeholders concerned with education.⁹⁴

Broadband Commission Working Group recommendations

- "Increase access to technology and broadband.
- Incorporate technology and broadband into job training and continuing education.
- Teach ICT skills and digital literacy to all educators and learners.
- Promote mobile learning and OERs.
- Support the development of content adapted to local contexts and languages.
- Work to bridge the technological divide between countries".

3.8.6 World Summit on the Information Society

The World Summit on the Information Society (WSIS), an initiative of ITU, was held in 2003 and 2005. In 2013 a WSIS+10 review process took place. That review put forward recommendations in two areas related to ICT in Education policy development.

WSIS+10 recommendations for ICT in Education policy development

Recommendations on the place of education in knowledge societies were made in session 17, subtitled "Changing Paradigms, Managing Sustainable Education" (IFIP, 26 February).

- "Redefining education: School systems should enable teachers and students to integrate formal and informal learning supporting new approaches offered through new media and learning technologies.
- Collaborative learning and research: Support collaborative research, of practitioners and researchers, addressing learners' effective use of new technologies in formal and informal settings; developing a formative, performance-based culture of assessment utilizing tools for learning together, also including analytical techniques and "gamification".
- Digital literacy and informatics: Develop a curriculum for teaching computing, including digital literacy and in particular computer science and informatics that will allow children in K12 education to have an access to knowledge that will make them creators of technology – not just its consumers.
- Explore international uses of blended education models and ICT-based models for educational organization, content, knowledge and communication management: Make these accessible to individual stakeholder groups – parents particularly – but also to school and educational managers, teachers, advisers and politicians.
- Explore the ICT skills needed by each different stakeholder group to engage with and support education: Make these widely accessible in the context of lifelong learning.
- Explore evolving practices of intergenerational learning. Make information accessible on how digital technologies can be used to support practices across generations".

(p. 6)

WSIS+10 recommendations on e-Learning

- "Harness the development of open pedagogies, resources and practices to support inclusive knowledge societies.
- Support programs on literacy education with a specific focus on women and girls, and for students and youths in emergency contexts to promote the universal access to high-quality primary education.
- Reorient the national or institutional curriculum for students in light of opportunities and challenges presented by the knowledge economy in the digital age. Broaden access to higher education and lifelong learning opportunities with a view of equity in tertiary education context, including the development of the quality assurance mechanism for online learning process, and the validation and accreditation of the outcomes of e-Learning programs in both formal and informal learning settings.
- Enable the networking of teacher institutions, schools and individual teachers to support professional development including through the provision of equitable access to the Internet to schools and institutions".

⁹³ www.itu.int/ITU-D/sis/newslog/CategoryView,category,ICT%2Bin%2BEducation.aspx

⁹⁴ Bokova, 2013, *Executive Summary*, p. 6

3.8.7 World Economic Forum

In 2012, the World Economic Forum published a report calling for collective and collaborative action to accelerate the adoption of m-Learning.⁹⁵ Much in that document is valuable for ICT in Education policy development, especially the chapter "From Pilot Projects to Critical Mass".

Catalyzing the rollout of m-Learning in developing countries

"According to the World Economic Forum, 3 factors will catalyze the rollout of m-Learning in developing countries:

1. Developing policy supportive of m-Learning. Most agree that the cost of access and inadequate connectivity remain the two biggest factors that limit m-Learning.
2. Developing a committed ecosystem. Mobile learning requires large-scale, broad cross-sector coordination.
3. Increased role of the ICT sector".

3.8.8 Market-based ICT services for the "base of the pyramid"

De Carvalho (2011) reports on a study of market-based ICT services, with education being one of the sectors analyzed.⁹⁶

Market-based ICT services for education

"There are very few education projects with truly market-based approaches targeting the poorest – be it "base of the pyramid" children or adults who still need education and professional training. We found only 21 ICT4Development projects specially focused on education, less than half of which had at least some market-based component.

Yet, without government procurement, it remains to be proven that there is sufficient purchasing power at the base of the pyramid for the development costs of ICT-based education (support) services. What is notably missing at this stage is a demonstrated commitment from governments to procure education services from private providers.

Within our database, 21 cases (or less than 8% of all cases) are specifically focused on education. Among them, 11 completely rely on grants and subsidies, 7 mix grants and payments, and only 3 are only based on payments. These figures illustrate the fact that up to today, it is very difficult to identify a mature business case for ICT-based educational projects targeting the "base of the pyramid".

3.9 ICT in Education policy plans

This section looks at ICT in Education policies with the aim of providing MOECD with advice on the content of ICT in Education policies for Suriname. Good practices in policy development are also identified, as well as lessons learned that could be relevant for Suriname.

Several references will be particularly useful:

- Policies and Practices for the Use of ICTs in Education in Latin America and the Caribbean (Hinostroza, 2011),
- ICTs in Education (ICT4Education) Policies and Plans Worldwide (GESCI, updated until 2011) (Bassi, 2010), and
- LAC ICT/Education Policies and Plans.⁹⁷

The GESCI and LAC ICT/Education overviews identify a range of ICT in Education policies. Many of the policies cover 2013 and future years but were written some years ago. We have chosen to focus on policies developed from 2010, which results in just a handful of policies.

The main publications that identify components of ICT in Education policy plans are the following:

- Survey of Schools: ICT in Education, Benchmarking Access, Use and Attitudes to Technology in Europe's Schools (2013);
- ICT in Education in Latin America and the Caribbean (UIS, 2012);
- Policy for Educational Transformation (Kozma, Intel, 2011);

⁹⁵ World Economic Forum (2012), Accelerating the Adoption of mLearning: A Call for Collective and Collaborative Action

⁹⁶ De Carvalho, 2011, p. 188

⁹⁷ <http://batchgeo.com/map/8936a5adac3066538a68cfc25c48fb43>

- Transforming Education: The Power of ICT Policies (UNESCO, 2011);
- Good Practice in ICT for Education (ADB, 2009);
- Information and Communication Technologies (ICT) in Education for Development (Gutterman, 2009);
- ICT in Education Toolkit from UNESCO Bangkok (updated until 2007).

“Survey of Schools” is not a publication on ICT policies. However, it does identify a range of factors judged as important for depicting progress on ICT in Education.

An important publication presenting a judgment on ICT in Education and related policies is the executive summary of IDB and Chong (2011):

- Development Connections: Unveiling the Impact of New Information Technologies Executive Summary.

The possible shifting focus of national ICT in Education policies is best described by “The Horizon Report, 2011, 2012 and 2013” (K-12 Edition).

2011

Time-to-Adoption Horizon

One Year or Less	Cloud Computing	Mobiles
Two to Three Years	Game-Based Learning	Open Content
Four to Five Years	Learning Analytics	Personal Learning Environments

2012

Time-to-Adoption Horizon

One Year or Less	Mobile Devices & Apps	Tablet Computing
Two to Three Years	Game-Based Learning	Personal Learning Environments
Four to Five Years	Augmented Reality	Natural User Interfaces

2013

Time-to-Adoption Horizon

One Year or Less	Cloud Computing	Mobile Learning
Two to Three Years	Learning Analytics	Open Content
Four to Five Years	3D Print	Virtual and Remote Laboratories

Over the three years the key topics are: Learning via Cloud Computing, Tablets, Mobile devices and Apps

Examples of (discussions or presentations of) National ICT in Education Policies (In reverse order of years of publication)

- Singapore: Masterplan 3⁹⁸ (2013)
- Colombia : Computers to Educate, ‘A road to knowledge’ (Ruiz Arteaga, 2013)
- Italy: Review of the Italian Strategy for Digital Schools (Avvisati, OECD, 2013)
- Vlaanderen: Advies over ICT-integratie in het leerplichtonderwijs (VLOR, 2013)
- Guyana: Information and Communication Technologies (ICT) Professional Development Strategy for Teachers in Guyana (2012)
- India: National Policy on Information and Communication Technology (ICT) In School Education (Ministry of HRD, 2011)
- Korea: E-Learning in the Republic of Korea (Hwang 2010)
- New Zealand: Elearnings: Implementing a national strategy for ICT in education, 1998–2010 (Ham 2010)

Hinostroza (2011) makes a number of points that could be relevant for the development of a national ICT in Education policy in Suriname.

Progression of ICT policy development in advanced countries (from Hinostroza, 2011)

⁹⁸ <http://ictconnection.moe.edu.sg/cos/o.x?c=/ictconnection/pagetree&func=view&rid=665>

"Because of the prospective benefits of ICTs, developed countries have closely followed the new technologies that are available for education. In many cases they have adjusted their policies to take advantage of the potential benefits of a specific technology to improve their education system outcomes. Analysis of ICT policies in education in developed countries reveals a three-stage progression:

1. During the first stage, policies seek mainly to ensure access by providing infrastructure, (basic) digital educational resources and competency training in the use of ICTs. In many cases, this first stage has been accompanied by government policies geared to reducing the digital divide by increasing ICT infrastructure available for use by communities. This stage also includes strategies for training in general ICT use and for creating incentives for the industry to adopt ICTs and/or use them in government services.
2. The second policy stage stresses strategies that ensure conditions for ICT use, with special attention paid to their use in teaching and learning. In many cases, this second stage includes national strategies to provide support aimed at ensuring that the proper conditions for using ICTs exist in each school, as well as incentives for using them in the classroom.
3. In the third stage, which is the current stage in many developed countries, the policy focus extends beyond schools and includes the use of ICTs by students in their communities. It also includes a broader and more specialized set of digital educational resources. In this third stage, despite differing levels of economic, social and ICT development among the countries, there are many similarities, such as the focus on developing faculty ICT competencies for teaching and an emerging trend toward the use of mobile devices and/or home-based ICT infrastructure as tools for extending teaching and learning beyond the classroom.

In the context of this third stage, developed countries show the following specific trends in terms of policies for ICTs in education:

- Faculty and teaching. Initiatives on a national scale for training faculty in ICT use as a tool supporting their work (including planning, teaching and testing) and, in some cases, for initial teacher training. Some countries also include guides for integrating ICTs with pedagogical practices, with an emphasis on teaching styles that encourage personalized learning.
- Students and learning. This includes strategies that seek to help students learn more independently, anytime and anywhere. Some countries have made significant investments in setting up distance education systems for school-age students;
- a highly structured type of learning that responds to individual learning needs.
- Curriculum development. In most countries the curriculum is revised to define and promote the enhancement of twenty-first century ICT skills and competencies. These include functional competencies (use of ICTs), higher-order thinking (discrimination, analysis and synthesis of information), collaboration skills (working in collaboration and cooperation networks) and lifelong learning.
- Digital educational resources. Practically all of the countries have initiatives for increasing the availability of digital educational resources. Some promote public-private partnerships with software companies and/or encourage local development of digital resources that adhere to specific quality standards. Other countries include targeted initiatives for evaluating resource quality and promoting the adoption of minimum standards.
- Infrastructure. In almost all of the countries the governments finance the provision and replacement of ICT infrastructure (computers, Internet access, etc.).
- ICTs, management and leadership. Many countries have initiatives that promote the integration of ICTs in management areas, including ICTs as part of the school's vision and coordinating actions to ensure technical and pedagogical support. Furthermore, some countries are using learning management systems in schools.
- Research and development. Some countries are considering initiatives to stimulate and support research and development in the field of education informatics, while others include initiatives that focus on innovation".

To characterize the situation in the different countries, Hinojosa uses indicators related to policies and indicators related to the implementation of the policies that are relevant for Suriname.

4. Status of ICT Integration in Education in Suriname

After reading the global overview on ICT in Education and analyzing the current situation in Suriname, can we draw conclusions about Suriname's position compared to other countries? A good model for policy development comparisons is the one used by the Southeast Asian Ministers of Education Organization (SEAMEO), published in 2010.

The report uses 10 dimensions, with 4 development phases for each dimension.⁹⁹ The dimensions are as follows:

1. national ICT in education vision,
2. national ICT in Education plans and policies,
3. complementary national ICT and education policies,
4. ICT infrastructure and resources in schools,
5. professional development for teachers and school leaders,
6. community/partnerships,
7. ICT in the national curriculum,
8. teaching and learning strategies and methods,
9. assessment, and
10. evaluation and research.

(p. 7)

The 4 development phases are as follows:

- emerging - those who have just started their ICT in Education journey;
- applying - those who have developed a new understanding of the contribution of ICT to learning;
- infusing - those who have integrated ICT into existing teaching, learning and administrative practices and policies; and
- transforming - those who have used ICT to support new ways of teaching, learning and administration.

(p. 12)

The table below provides a description of each dimension and what the different development phases mean. Written in blue, is the status of Suriname based on our own interpretation.

ICT in Education Dimensions	Emerging	Applying	Infusing	Transforming
1. National ICT in Education vision	The establishment of a shared ICT in Education vision and its underlying philosophy provides policy makers, education leaders and educators with a vehicle for coherent communication about how ICT may be effectively used for teaching, learning and administration.			
	Vision is ICT-driven with little or no consideration for existing culture, policies and practices.	Vision focuses on the use of ICT to support existing culture, policies and practices.	Vision focuses on driving changes in culture, policies and practices mediated by ICT.	Vision is of exemplary quality and is being studied and emulated by other countries.
	Suriname: No explicit vision has yet been developed. MOECD has started a process to develop an ICT in Education policy (2014), including a ICT in Education vision.			

⁹⁹ Based on UNESCO's model of ICT Development in Education (UNESCO, 2005)

2. National ICT in Education plans and policies	Implementation of ICT in Education strategies has to be guided by a strategically developed national ICT in Education plan. This is a complex task, requiring careful planning, consultations with various stakeholders and financial resources. It also requires understanding of various socio-cultural and historical aspects of the system, current and emerging technologies, and global trends and developments.			
	Non-existent or ICT-driven plans and policies. No planned funding.	Limited. ICT development led by specialist. Centralized policies. Hardware and software funding. Automating existing practices.	Individual subject plans include ICT. Permissive policies. Broadly-based funding, including teacher professional development.	ICT is integral to overall school development plan. All students and all teachers involved. Inclusive policies. All aspects of ICT funding integral to overall education budget. Integral professional development.
	Suriname: Non-existent or ICT-driven plans and policies as yet, but ICT in Education policy is planned for January 2014.	Suriname: Limited. ICT development led by local initiatives.		
3. Complementary national ICT and education policies	The education system and policy support in the areas of budget, curriculum, professional development and research may facilitate or hinder the launching of a country's ICT in Education policies or plans, as well as their sustainability and scalability in the future. The national ICT infrastructure (connectivity and accessibility) may also affect the implementation of ICT in Education policies and plans. All these elements are within a larger environmental context that may include the need to develop a competitive workforce, regionally and globally, the economic cycle that a country or the world is undergoing, economic policies (budget cuts or expansionary fiscal policies), political and social stability, the bureaucracy of the system, and so on.			
	There is little or no linkage between the ICT in Education policies and national ICT and education policies	There are links between the ICT in Education policies and national ICT and education policies but some of the policies are contradictory.	The ICT in Education policies complements the national ICT and education policies. However, it is usually the latter that inform and/or support the former.	The ICT in Education policies complements the national ICT and education policies. The policies inform and support one another.
	Suriname: A national ICT in Education policy is planned for January 2014 including an implementation plan.			
4. ICT infrastructure and resources in schools	Access to ICT infrastructure and resources in schools is a necessary condition for the integration of ICT in Education. Setting up schools' ICT infrastructure requires consideration of available physical infrastructure (e.g., rooms for servers, computer rooms, installing cables and network points, positioning of wireless hubs and electricity supply points). Human resources are needed to set up and maintain this infrastructure, and financial resources are required to support the setting up and maintenance. The ICT infrastructure in schools has to be designed to allow for expansion and changes in response to ICT developments and educational needs. Moreover, schools need access to ICT resources to mediate teaching and learning, not just in the classroom and school environment, but anywhere and anytime.			
	Stand-alone workstations for administration. Individual classrooms.	Computer lab or individual classrooms for ICT specific outcomes.	Computer lab and/or classroom computers. Networked classrooms.	Whole school learning with ICT with access to technology resources and a

	<p>Computers and printers. Word processing, spreadsheets, database, presentation software. School administration software.</p>	<p>Computers, printers and limited peripherals. Word processing, spreadsheets, databases, presentation software. ICT software. Internet access.</p>	<p>Intranet and Internet. Resource-rich learning centers. Range of devices, including digital cameras, scanners, and video and audio recorders. Video-conferencing. Range of subject-oriented content. Range of subject-specific software and localized digital resources accessible via the central repository system.</p>	<p>wide range of current devices. The whole range of devices in the column to the left and web-based learning spaces. Conferencing and collaboration. Distance education. Web courseware. Student self-management software. Schools have the autonomy to manage their own infrastructure and resources. Schools share the digital resources that they have created with one another.</p>
	<p>Suriname: Stand-alone workstations for administration (e-School) in around 100 schools. Individual classrooms. Computers and printers. Word processing, spreadsheets, database, presentation software.</p>	<p>Suriname: Computer labs or individual classrooms for ICT-specific outcomes. Computers, printers and limited peripherals. Word processing, spreadsheets, databases, presentation software. ICT software. Internet access. All based on private initiatives.</p>	<p>Suriname: Computer labs and/or classroom computers. Networked classrooms. Intranet and Internet. Resource-rich learning centers. There are initiatives like computer-aided learning but not on a large scale. Only pilots.</p>	
<p>5. Professional development for teachers and school leaders</p>	<p>Teachers in the ICT-mediated learning environments have to take on the more demanding role of mediator and knowledge broker: to provide guidance, strategic support, and assistance to help students at all levels to assume increasing responsibility for their own learning. At the same time, school leaders need to be acquainted with the art and science of ICT integration in order to support the teachers in their schools. The challenge then for professional development programs is to prepare teachers and school leaders who are open to new ideas, new practices and ICT, to learn how to learn, unlearn and relearn, and to understand and accept the need for change. Professional development is "the sum total of formal and informal learning experiences throughout one's career from pre-service teacher education to retirement". It includes support for teachers and school leaders to examine and transform their own practices based on their evolving understanding of teaching and learning</p>			
	<p>Awareness of needs for professional development but no plan for teachers and school leaders. If a plan exists, it is not based on a needs and situation analysis.</p>	<p>ICT applications training. Unplanned. Personal ICT skills.</p>	<p>Subject specific. Professional skills. Integrating subject areas using ICT. Evolving.</p>	<p>Focus on learning and management of learning. Self-managed, personal vision and plan, school supported. Innovative and creative. Integrated learning community with students and</p>

				teachers as co-learners.
	<p>Suriname: Awareness of need for professional development, but no plan for teachers and school leaders to address this in a structural way.</p> <p>Training is mostly targeted at basic general ICT (computer) skills.</p>	<p>Suriname: ICT applications training (MS Office, Internet browsing and e-mail). Unplanned. Personal ICT skills.</p> <p>Many teachers have their own laptop and teach themselves how to use it. Not with focus on how to use in teaching and learning.</p>		
6. Community/ partnerships	<p>Globalization is a complex and multidimensional phenomenon that has become a part of everyday life. Globalization complicates local, national and global boundaries and creates tension between local and global dynamics. In light of such a phenomenon and its associated challenges, learning for engagement has to provide students with opportunities to critically examine local and global issues and act upon them. ICT enables such engagement by bringing the learning experiences of the students beyond the four walls of the classroom. Schools may then start engaging local and global communities, facilitated by ICT, and make such engagement an integral part of their curriculum and assessment. At the same time, there is growing belief that no one sector can effectively bring together the resources and capability to address or resolve the social and development issues we are facing. Public-private partnerships are a possible mechanism for developing and sustaining public infrastructure and services that has drawn increasing interest from governments around the world. These focus on shared responsibility of both the public and the private sectors towards provision and maintenance of infrastructure and services for the general population.</p>			
	<p>Discreet donations. Problem-driven. Accidental.</p>	<p>Seeking donations and grants. Parental and community involvement in ICT.</p>	<p>Subject-based learning community providing discrete, occasional assistance, by request. Global and local networked communities.</p>	<p>Broad-based learning community actively involves families, business, industry and universities. School is a learning resource for the community – physically and virtually.</p>
	<p>Suriname: Discreet donations. Problem-driven. Accidental.</p> <p>Small private initiatives supported by individuals.</p>	<p>Suriname: Seeking donations and grants. Parental and community involvement in ICT.</p> <p>Larger pilots with UNICEF and NGOs.</p> <p>Sponsorship by companies.</p>		
7. ICT in the national curriculum	<p>The discussion in this report so far has emphasized that the study of ICT in Education cannot be isolated from the learning environment in which it is situated. ICT may trigger changes in the activities, curricula and interpersonal relationships in the learning environment, and is reciprocally affected by the very changes it causes.</p>			
	<p>ICT literacy development is part of the</p>	<p>Applying ICT within discrete subjects. Use of</p>	<p>Infusion with non-ICT content. Integrated learning systems. Authentic</p>	<p>Virtual and real-time contexts. ICT is accepted as a pedagogical agent</p>

	national curriculum.	artificial and isolated contexts.	contexts. Problem solving projects.	& the curriculum is delivered online and face-to-face.
	Suriname: ICT literacy development is part of the national curriculum.	Suriname: Applying ICT within discrete subjects. In some pilots digital content is used in teaching math and language.		
8. Teaching and learning strategies and methods	<p>ICT provides opportunities for teachers to support students in their own constructive thinking. It allows them to transcend their cognitive limitations, and it engages them in cognitive operations that they may not have been capable of otherwise. When such students' thinking processes are supported by ICT in school, the school is considered to be at the transforming stage of ICT-mediated teaching and learning pedagogies. The pedagogies adopted by teachers at this stage are situated in the constructivist paradigm where learning is perceived as an active construction and reconstruction of knowledge, and teaching as a process of guiding and facilitating students in the process of knowledge construction individually and collaboratively.</p> <p>Constructivist pedagogical strategies include problem-based, project-based, collaborative-based and case-based learning. These ICT-mediated teaching and learning pedagogies are contrasted with those in the emerging or applying stage, where the latter are situated in the traditional paradigm. In this paradigm, teaching is perceived as a didactic way of disseminating information to students and learning as a passive activity, with students doing minimal task management or holding little responsibility for their own learning.</p> <p>It should be noted that traditional and constructivist teaching and learning pedagogies are not to be treated as a dichotomy; the stance of this report is that the opportunities of supporting students in the process of knowledge construction provided by ICT are often not taken up in Southeast Asian schools. Hence, only a small number of these schools are in the transforming stage of this dimension.</p>			
	Teacher-centered didactic	Factual knowledge-based learning. Teacher-centered didactic. ICT a separate subject.	Learner-centered learning. Collaborative.	Critical thinking. Informed decision-making. Whole learner, multi-sensory learning styles. Experimental.
	Suriname: Teacher-centered didactic.	Suriname: Factual knowledge-based learning. Teacher-centered didactic. ICT as a separate subject. Pilot UNICEF project on ICT integration in math and language, but still with teacher centered didactics.		
9. Assessment	<p>Designing assessment is an integral part of curriculum development. Assessments that are not linked to the curriculum are not valid forms of assessment. Moreover, well-designed assessment tasks are pivotal in engaging students in the learning process. Although ICT-mediated learning environments provide opportunities for students' engagement, this engagement may be compromised when teachers, who are accountable for students' results, teach to high-stake national examinations.</p>			
	Equipment-based. Budget-oriented. Discrete subjects. Didactic. Paper	Skills-based. Teacher-centered. Subject focused. Reporting levels. Moderated within subject areas	Integrated. Portfolios. Subject-oriented. Learner-centered. Multiple media to demonstrate	Continuous. Holistic – the whole learner. Peer-mediated. Learner-centered. Learning

	and pencil. Closed tasks.		attainment. Moderated across subject areas.	community involvement. Open-ended. Project-based.
	Suriname: Most assessment still paper-and- pencil based.	Suriname: In UNICEF pilot project, skills are assessed for math and language via stand alone laptops.		
10. Evaluation and research	Existing ICT policies and practices need to be regularly audited and evaluated in order to identify areas for improvements and revisions. It is critical that all the key stakeholders of ICT in education are involved in the auditing, identification of gaps and areas for improvements, and revision. In addition, schools will benefit from regular evaluation of teaching and learning for potential relevance, suitability of curriculum content, and appropriateness in terms of dominant pedagogical practices and ICT uses.			
	Evaluation is to be distinguished from research, where research is best described as the systematic and objective approach to scholarly inquiry that is directed toward a solution of a problem and advancement of human knowledge through development of theories. It utilizes carefully designed procedures that apply rigorous analysis and build on what is already known about an educational problem and how others have investigated it or similar problems in the field.			
	There is no evaluation and research plan in the formulation and implementation of the ICT plan.	Evaluation of the implementation of the ICT plan is summative in nature. There is no research to provide evidence- based policies.	Evaluation is both summative and formative. Research provides evidence-based policies but does not push the boundaries of existing policies and practices.	Evaluation is both summative and formative in nature. Research provides evidence- based policies and pushes the boundaries of existing policies and practices.
	Suriname: Not included, plan is under development			

5. Recommendations and research questions

This report began with an introduction and overview of the current status of e-Education in Suriname and in many other countries and regions of the world. The good practices, lessons learned and challenges observed elsewhere were then combined with insights on the current situation in Suriname to seek ways to support the design a national ICT in Education policy. This comparative overview should provide clarity on what options are likely to fit (or not to fit) the future situation in Suriname. These options should serve as useful inputs for stakeholders in Suriname in development of a National ICT in Education Policy.

Recommendations and questions for further research are structured around the 10 dimensions of the ICT in Education policy framework used earlier. In paragraph 5.1 we will suggest a possible ICT in Education Policy Framework.

1. National ICT in Education vision
 - Acknowledge that education leads ICT in the vision. How might e-Education contribute to educational outcomes, such as better learning outcomes, improved Dutch language and mathematics skills, lower drop-out rates and lower grade repetition rates? Technology is merely a tool to support the overall education vision.
 - Create a shared vision among all stakeholders to ensure ownership and readiness to change from the start.
 - Work towards a shared definition of what e-Education means in the Suriname context.
2. National ICT in education plans and policies
 - Take an evolutionary approach: work step-by-step for an extended period.
 - A high level support is needed to implement the necessary changes.
 - Create space for different solutions for Paramaribo, for other coastal areas and for the interior.
 - Clarify and reach consensus on different roles and responsibilities in the national ICT in Education policy.
 - Include all inputs (not only hardware) to draw up a realistic investment plan, and make clear who will be responsible for funding which budget lines.
 - Establish a separate entity to coordinate implementation of the national ICT in Education policy.
 - Build capacity at MOECD to implement the national ICT in Education policy.
 - Provide clear guidance for integration of ICT in schools.
3. Complementarity of national ICT and education policies
 - Stimulate collaboration between ministries and involve the private sector, civil society and the education sector.
4. ICT infrastructure and resources in schools
 - Base ICT infrastructure on the needs and resources of schools (not all schools need the same infrastructure, not all classes need the same tools).
 - Collaborate with telecom providers to connect all schools to the Internet at affordable rates.
 - Offer a low-tech infrastructure to schools that do not need specialized ICT skills at the school level (remote support).
 - Build ICT support capacity outside of Paramaribo.
 - Address electricity needs of schools.
 - Don't focus on ICT labs only, but also consider solutions like ICT in the classroom (tablets/laptops/projectors), teacher resource rooms (laptops), media rooms, and radio or TV-based instruction.
 - Set up a platform to share digital resources and experiences between schools, teachers and students.
 - Adapt digital learning materials to the local context.
5. Professional development for teachers and school leaders
 - Use the UNESCO ICT Competence Framework for Teachers as the base for teacher training in Suriname, but adapt it to fit the Suriname context.
 - Collaborate with Guyana to learn more from its experiences.

- Investigate how distance learning could be organized in the interior and the necessary conditions to make it sustainable (from connectivity and hardware to organization and relevant content).
 - Explore whether distance learning and Internet access could provide ways to attract more trained teachers to work in the interior.
 - Integrate pedagogical skills, ICT skills and content skills in new teaching methodologies.
 - Introduce integrated ICT competencies in pre-service training for teachers.
 - Create a platform for peer learning between teachers.
6. Community partnerships
- Stimulate local initiatives (bottom-up) within a national ICT in Education policy (top-down). Strengthen the capacity of existing organizations with expertise in education, but without expertise in ICT
 - Involve parents and communities by building on existing governance structures in and around the school.
 - Create conditions for sustainability (in regard to finances, maintenance and social responsibility) from the start of implementation.
7. ICT in the national curriculum
- Integrate ICT in all subjects over the long term.
 - Involve teachers in instructional design of digital education resources.
 - Adapt digital learning materials for the Surinamese context.
 - Include pre-primary schools from the start.
 - Develop new digital resources as open educational resources that can be adapted and shared between schools.
8. Teaching and learning strategies and methods
- A fundamental change in teaching strategies and in learning behavior has not yet been achieved elsewhere, despite large investments in ICT infrastructure and ICT capacity building of teachers. What might Suriname learn from this?
 - Technology skills have to be integrated with didactic skills to avoid the trap of introducing innovative technology as a goal and not as a tool.
 - Different ICT mixes will work best for different classes and subjects. Classical teaching methods, group assignments, computer-aided instruction, radio and TV and mobile-assisted learning are different parts of the mix. Which approaches are most appropriate for which subjects in the context of Suriname?
 - Introduce ways to assess students' pre-existing knowledge and skills, given that students use technology on a daily basis for online collaboration.
9. Assessment
- Introduce assessment methods that fit the (new) curriculum and that also make use of ICT so that students become acquainted with ICT while learning.
 - Strive to avoid an over-emphasis on ICT in curricula and exams.
10. Evaluation and research
- Large organizations like the World Bank and UIS put much emphasis on collection of evidence on the impact of ICT in Education. Monitoring and evaluation frameworks are provided, mostly with numerous indicators to be measured. How will these be used in Suriname? Which indicators are really relevant? What is an appropriate way to measure the impact of a national ICT in Education policy?

5.1 Possible framework for an e-Education policy in Suriname

1. National ICT in Education vision	Vision on e-Education Characteristics of the education system in Suriname Innovation of education in Suriname Role of MOECD and boards of education Role of organizations supporting innovation in education Social and economic development in Suriname and the role of ICT Data communication in Suriname Regional and international cooperation on e-Education
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2. National ICT in Education plans and policies	Experiences with ICT in Education in Suriname Regional and international developments on e-Education E-Education plan, general principles and characteristics E-Education policies to be developed (on e-safety, e-waste, etc.) Consequences of e-Education for the task and organization of MOECD Theory of change, implementation principles Implementation structure Involvement of education stakeholders Involvement of (local) business stakeholders Communication about (implementation of) e-Education
3. Complementary national ICT and education policies	Complementary national ICT policies Cooperation with other ministries Complementary national education policies Intended changes in complementary education policies
4. ICT infrastructure and resources in schools	Current ICT infrastructure and resources in and for schools The role of TAS and Internet providers Intended future ICT infrastructure and resources in and for schools Use of Internet, data communication Use of hardware Use of courseware, learning management systems, administrative software, open educational resources Localization of courseware Organization of implementation and procurement of ICT infrastructure and resources (including supporting measures regarding electricity, safety, etc.) Organization of ongoing support to schools
5. Professional development for teachers and school leaders	Intended changes in the role of teachers and school managers Intended changes in the role of students Intended changes in the role of stakeholders like inspectorate New roles in e-Education (ICT support personnel) Professional development for all categories involved Organization of professional development Use of ICT for knowledge exchange between teachers, school management and other stakeholders Use of ICT in general professional development
6. Community/ partnerships	Intended changes in the role of communities Development activities for community members Organization of development activities
7. ICT in the national curriculum	ICT in the current curriculum Intended changes in the current curriculum Organization of curriculum development
8. Teaching and learning pedagogies	Current teaching and learning strategies and methods Intended changes in teaching and learning strategies and methods
9. Assessment	Current means of assessment Intended changes in assessment Organization of assessment
10. Evaluation and research	Monitoring, evaluation and research of implementation of e-Education policy Organization of monitoring, evaluation and research Cooperation with international organizations (like UIS)

References

- 2012 Information and Communications for Development 2012, Maximizing Mobile, IBRD, The World Bank, 2012, WBG, 2012
- Accelerating the Adoption of mLearning: A Call for Collective and Collaborative Action, WEF, 2012
- Adam, Lishan, a.o., Transformation-Ready: The strategic application of information and communication technologies in Africa, ICT Development Associates, 2011
- Adolph, Martin, Standards for technology-enabled learning, ITU-T Technology Watch Report, ITU, 2012
- Advies over ICT-integratie in het leerplichtonderwijs, Vlor, 2013
- An Introduction To Next Generation Blended Schools, Next Generation Learning Challenges, 2012
- Annual Report 2012, Digital Promise, 2013
- Aranguran, Andrea, iten, Inter-American Teacher Education Network, A Community of Innovative Leaders in Education, OAS, 2011
- Atchoarena, David, Policy Guidelines for Mobile Learning for EFA, 2012
- Atchoarena, David, UNESCO ICT in Education policy programme, Challenges, Focus Areas, and Deliverable, 2012
- Avvisati, F, a.o., Italy: Review of the Italian Strategy for Digital Schools, OECD, 2013
- Bailey, John, a.o., Getting Ready for online assessments, Digital Learning Now!, 2012
- Background Document, Advancing the Regional Agenda for ICT, Caribbean Heads of Government, 2013
- Bakia, Marianne, a.o., Understanding the Implications of Online Learning for Educational Productivity, US DoE, 2012
- Bakia, Marianne, International Experiences With Technology in Education: Final Report U.S. Department of Education, 2011
- Balboni, Mariana, a.o., ICT in Latin America, A microdata analysis, ECLAC, 2011
- Banel, E. , Needs Assessment MOECD key departments, Eriban Consultancy and Training, 2010
- Bassi, Roxana, Deploying 1:1 educational models in large scale: a practical budgeting tool based on TCO, GESCI, 2010
- Bassi, Roxana, ICTs in Education (ICT4E) Policies and Plans worldwide, version 8, GESCI, n.d.
- Beleid begint bij de samenleving, eGov, eGovernment Strategie 2012-2016 van de Republiek Suriname, 2012
- Bernatek, Brad, a.o., Blended Learning in Practice: Introduction to Case Studies from Leading Schools, FSG, 2012
- Bienkowski , Marie, a.o., Enhancing Teaching and Learning Through Educational Data Mining and Learning Analytic, US DoE, OET, 2012
- Bilbao-Osorio, Beñat a.o. (eds.),The Global Information Technology Report 2013, Growth and Jobs in a Hyperconnected World, INSEAD, WEF, 2013
- Bokova, Irina, Technology, Broadband and Education, Advancing the Education for All Agenda, Broadband Commission for Digital Development, Working Group on Education, 2013
- Bos, Maria Soledad, a.o., A New Context for Teachers in Latin America and the Caribbean, IDB, 2012
- Bos, Maria Soledad, a.o., ¿Qué tan desiguales son los aprendizajes en América Latina y el Caribe?, BID 2012
- Burns, Mary, Distance Education for Teacher Training, EDC, 2011
- Butcher, Neil, A Basic Guide to Open Educational Resources, COL, UNESCO, 2011
- Butcher, Neil, Development of 21st Century Skills for Innovation and Enterprise: Exploring the role of Informal Learning Environments in the Development of Skills and Aptitudes for the Digital Creative Media Industries, GESCI, 2013
- Butcher, Neil, ICT, Education, Development, and the Knowledge Society, GESCI, 2011
- Buyers' Guide to Sustainable ICT Infrastructure in Low Resource Settings, Inveneo, 2011
- CAL Activity plan, Programme Outcomes and anticipated Outputs, MOECD, UNICEF, n.d.
- Campero, Pilar, Education and Technology in Chile, GE, 2011
- Michael Fullan, Nancy Watson and Stephen Anderson CEIBAL:NEXT STEPS, Michael Fullan, Enterprises, 2013
- Cho, Nam-Joon, InfollutionZERO, Shaping Policy towards a Green Digital World 2012
- Chong, Alberto, Development connections; unveiling the impact of new information technologies, IDB, Palgrave, MacMillan, 2011
- Christia, J.P. a.o., Technology and Child Development: Evidence from the One Laptop per Child Program, IADB, 2012
- Chubb, John E., Overcoming the Governance Challenge in K-12 Online Learning, 2012
- Competitiveness Unit Suriname belicht, Overheidskrant, 2013
- Computer Aided Learning in Suriname, As per Annual Work Plan #9 – Education Activity #6, UNICEF Suriname, 2011
- Conceptnota Mediawijsheid, Vlaams Ministerie van Onderwijs, Jeugd, Gelijke Kansen en Brussel, 2011
- Connect and Inspire Online Communities of Practice in Education, US DoE, OET, 2011
- Cousins, Jackie, The Status of the Use and Integration of ICT in Curriculum in Primary Schools in CARICOM Member States, 2011
- De Boer, Wim, Pieter van der Hijden, Ton Wolf, Rapport Haalbaarheidsstudie, met 3 bijlagen, ECOIS 2009

- De Carvalho, Alexandre, a.o., Leveraging ICT for the Base of the Pyramid, Hystra, 2011
- De la Torre, Marisa, a.o. Turning Around Low-Performing Schools in Chicago, University of Chicago, 2012
- Deriquito, Mario, Zenaida Domingo, Mobile Learning for Teachers in Asia, UNESCO, 2012
- Digital "to-do" list: new digital priorities for 2013-2014, EC, 2012
- Digital Online Curriculum Evaluation Network (DOCENT) Overview, Digital Promise, n.d.
- Draft Regional Information and Communication Technology (ICT) for Development Strategy, CARICOM, 2010
- Education and Training Monitor 2012, Accompanying the document: Rethinking education: investing in skills for better socio-economic outcomes, EC, 2012
- Education Innovation Clusters Accelerating the Pace of Innovation, n.d.
- Education Sector Study, Educational Development in The Republic Of Suriname, A Report prepared for 47th session of the International Conference on Education, 2004
- Eerst onderwijsvisie, dan techniek, Kennisnet, 2010
- Expanding Evidence Approaches for Learning in a Digital World, US DoE, OET, 2013
- Fachelli, Sandra, a.o., Desigualdad y diversidad en América Latina: hacia un análisis tipológico comparado, IIEP, 2012
- Farrell, Maria, Developing an National E-Waste Policy, infoDev, The World Bank, 2011
- From need to sustainability, the IICD Approach, IICD, 2013
- Fullan, Michael a.o., CEIBAL: Next Steps, Final Report, 2013
- Furber, Steve, Shut down or restart? The way forward for computing in UK schools, The Royal Society, 2012
- Gaible, Edmond, Education change, leadership and the knowledge society, GESCI, 2010
- Gaible, Edmond, Survey of ICT and Education in the Caribbean: A summary report, Based on 16 Country Surveys. infoDev / World Bank, 2008
- Gary Miron and Jessica L. Urschel, Understanding and Improving Full-Time Virtual Schools, NEPC, 2012
- Gonzalez, Brian G., Transforming Education, Global Trends and learnings, Intel, 2011
- Good Practice in in Information and Communication Technology for Education, ADB, 2009
- Gutterman, B., a.o., Information & Communication Technologies (ICT) in Education for Development, G@ID, 2009
- Haanemayer, Dick (red.), Evaluatie Stichting Kennisnet en Stichting ICT, Eindrapport, 2005
- Haddad, Wadi D., UNESCO n.a.
http://www.ictinedtoolkit.org/usere/p_page.php?section_number=0
 Part 1 - ICT for Education: Decision Makers Essentials,
 Part 2 - ICTs for Education: Analytical Review
 Part 3 - ICT for Education: Resources
- Ham, V & Wenmoth, D. (Eds.), Elearnings: Implementing a national strategy for ICT in education, 1998-2010, 2010
- Hensen, J.G., Het binnenland (district) van Suriname gaat digitaal, Beleidsplan ter bevordering van het basisonderwijs en LBGO voor het binnenland (districten) in de Marowijne van Suriname, n.d.
- Het binnenland (district) van Suriname gaat digitaal (draft), 2012
- Hine, Paul (ed.), UNESCO ICT Competency Framework for Teachers Version 2.0, 2011
- Hinojosa, J. Enrique, Christian Labbé, Policies and practices for the use of information and communications technologies (ICTs) in education in Latin America and the Caribbean, ECLAC, 2011
- Hofman, Bob, a.o., Learning Circle Suriname – Nederland, ICT-Edu, n.d.
- Hooker, Maru, Roxana Bassi, African Leadership in ICT, GESCI, 2011
- Hoosen, Sarah, Survey on Governments' Open Educational Resources (OER) Policies, COL, UNESCO, 2012
- Horn, Robin, SABER, System assessment & Benchmarking for Education Results, Integrative Framework, The World Bank, 2011
- Howe, Kenneth R. and David E. Meens, How Recent Educational Reforms Undermine Local School Governance and Democratic Education, Great Lakes Center, 2012
- Hwang, D. J., a.o., E-Learning in the Republic of Korea, UNESCO Institute for Information Technologies in Education, 2010
- ICT and Computer Science in UK schools, Naace, ITTE, and the Computing at School Working Group, 2012
- ICT for education: five years of learning, IICD, 2013
- ICT for Greater Development Impact, World Bank Group Strategy for Information and Communication Technology, 2012-2015
- ICT in Education in Central and West Asia Executive Summary, Asian Development Bank, 2012.
- ICT in Education in Latin America and the Caribbean, A regional analysis of ICT integration and e-readiness, UIS, 2012
- ICT-bekwaamheid leraren, Kennisnet 2012
- infoDEV's Work Program 2013-2015, The World Bank, 2013
- Informatie- en Communicatietechnologie en Onderwijs, Onderwijsraad, 1998
- Information and Communication Technologies (ICT) Professional Development Strategy for Teachers in Guyana, 2012

- Information and Communication Technology Strategy for Education In Malawi 2012 – 2017 Second Draft, MEST, 2011
- Investing in People's Knowledge and Skills to Promote Development, World Bank Group Education Strategy 2020
- Isaacs S (ed.), The eLearning Africa Report 2013, ICWE: Germany, 2013
- Isaacs, S. and Hollow, D., (eds), The eLearning Africa 2012 Report, ICWE: Germany, 2012
- Ito, Mizuko, Connected Learning, Connected Learning Research Network, 2013
- Jaarverslag Hogeschool Edith Stein/OCT Helemaal bij de les, 2011
- Jara, Ignacio, a.o., Mobile Learning for Teachers in Latin America, 2012
- Jimenez-Iglesias, Carla, Case Studies of National and Regional Implementation Schemes Related to the Use of ICTs in Education, 2012
- Johnson, L., a.o., NMC Horizon Report:2011, 2012 and 2013 K-12 Edition
- Jules, Didacus, Development of a CARICOM Strategic Plan for Primary and Secondary Education Services in the CARICOM Single Market and Economy (CSME), University of the West-Indies, 2010
- Kennisnet, Jaarplan 2012, 2011
- Kennisnet, Jaarverslag 2012, 2013
- Key Data on Learning and Innovation through ICT at School in Europe 2011, Eurydice, EC, 2011
- Khelladi, Yacine, Reducing Disparities through the use of ICT in Suriname, 2012
- Klarenbeek, M., H. Maat en D. Verboom, Quality Education. A vision on teaching and learning. Edukans, 2012
- Korthagen, F., Authenticiteit en betrokkenheid als basis voor goed onderwijs. In: L. Stevens (Red.), Leraar wie ben je? (pp. 25-33), Garant, 2008
- Kozma, Robert B., Policy for Educational Transformation, Intel, 2011 and 2012
- Kozma, Robert B., Policy Development Guidebook, Intel,
- Kozma, Robert B., Comparative Analysis of Policies for ICT in Education, Center for Technology in Learning, SRI International 2010
- Kozma, Robert, ICT Policy Resources from Intel, 2012
- Laat ict werken voor het onderwijs, Kennisnet meerjarenplan 2013-2017
- LAC ICT/Education Policies and Plans
- Learning Powered by Technology, National Education Technology Plan, US DoE, OET, 2010
- Leighton, Seth, a.o., Asia Pacific Ministerial Forum on ICT in Education 2012, Outcome Document, 2012
- Leren met ICT: Nieuwe accenten, Onderwijsraad, 1999
- Light, Daniel, Using Assessment to Promote 21st Century Learning, EDC, 2011
- Lugo, María Teresa and Sebastián Schurmann, Turning on Mobile Learning in Latin America, 2012
- Lustig, Nora, a.o., Declining Inequality in Latin America in the 2000s: The Cases of Argentina, Brazil, and Mexico, Center for Global Development, 2012
- Lyonarons, Myrthe, Computer Aided Learning Project, A baseline study report on children's and teachers' performance in Math and Language, and satisfaction levels of children, teachers, parents and communities, MOECD, UNICEF, 2013
- Lyonarons, Myrthe, Computer Aided Learning school analysis action plan, MOECD, UNICEF, 2012
- Maak kennis met TPACK, Hoe kan een leraar ict integreren in het onderwijs, Kennisnet, 2011
- Maddens-Toscano, Sofie, Draft Suriname National School Connectivity Plan, for TAS, ITU, n.d.
- Mainstreaming e-Learning in education and training, DAE action 68, Digital Agenda Assembly, EU, 2011
- Mao, Jeff, Maine Learning Initiative, 2011
- Maughan, Sarah, a.o., What leads to positive change in teaching practice?, NFER, 2012
- Mayer, Susan E., Computadores en las escuelas y desempeño cognitivo 2012
- Mayor benefits in education and training follow study visits. Publications Office of the European Union Cedefop, 2011
- McGreal, Rory, a.o. (eds.), Open Educational Resources: Innovation, Research and Practice, COL, 2013
- Meijer, P.C., Korthagen, F.A.J. & Vasalos, A., Supporting presence in teacher education: The connection between the personal and professional aspects of teaching, Teaching and teacher education, Volume: 25 Issue: 2 (February 2009), 297-308.
- Merodo, Alicia, a.o., The Inclusion of ICT in Initial Teacher Training, OAS, 2012
- Miao, Fengchun, ICT in Education Policy Development and Review: A Sector-wide Framework and Good Examples, UNESCO, 2011
- Milner, H. Richard, IV, Policy Reforms and De-Professionalization of Teaching, NEPC, Mobile on the Move, Opportunities in Mobile Learning from IICD's Perspective, IICD, 2013
- Model Project Plan, ProjectRED, n.d.
- Myanmar ICT Master Plan Executive Summary, 2011
- Našlund-Hadley, Emma, a.o., Leading the Way to Math and Science Success: Challenges and Triumphs in Paraguay, IDB, 2012
- National Policy on Information and Communication Technology (ICT) In School Education, Ministry of HRD India, 2011
- Navorro, Skills, Innovation and Competitiveness, Suriname's priorities and IDB's contribution to address them, IDB, 2013
- Ng, Wai-Kong, a.o., Capacity-building for ICT integration in education, Digital Review of Asia Pacific 2009-2010

- Onderwijs en Open Leermiddelen, Onderwijsraad, 2008
- One Laptop Per Family: One Family – One Community – One Internet, One Connected Country, Project Management Office Office of Climate Change, 2010
- Ori, Henry, a.o. (ed.), Ik geloof in jou, Leerlinggericht en kindvriendelijk onderwijs, dromen en durven, denken, doen, MOECD, PROGRESS, UNICEF, 2009
- Prathap Chandran, D., Towards a National Policy on ICT in School Education in India – A Critical Perspective, 2011
- Promoting critical knowledge, skills and qualifications for sustainable development in Africa: How to design and implement an effective response by education and training systems, ADEA 2012
- Results for Learning Report 2012: Fostering Evidence-Based Dialogue to Monitor Access and Quality in Education, Global Partnership for Education, 2012.
- Reyes, Loreto y Sergio Urzúa, La demanda y oferta de educación temprana en Chile 2012
- Ray, Mark, Kiva Powell, ICT Learning Outcomes for Primary Schools in the Caribbean, CARICOM, 2011
- Rowe, Naomi, a.o., Mapping of seminal reports on good teaching, NFER 2012
- Ruiz Arteaga, Juan Carlos, presentation, Computers to Educate, 'A road to knowledge', May 2013
- SABER ICT Systems Approach for Better Education Results (SABER): The Use of ICTS Master list of ICT/education policy documents 2013, Draft working document, WB, 2013
- Schaaper, Martin, ICT's in Education, How data can support transparent and effective policy making, UIS, 2012
- School Mapping ten behoeve van Planning en Beleid in de Republiek Suriname Ministerie van Onderwijs en Volksontwikkeling in samenwerking met UNICEF en de VVOB, MOECD Onderzoek en Planning, 2010
- Seog-Soo, Han, Educational Innovation & Use of ICT in Education, MEST, 2011
- Severin, Eugenio, a.o., Technologies for Education, Basic Guidelines for Project Evaluation, IDB 2012
- Severin, Eugenio, Christine Capota, One-to-One Laptop Programs in Latin America and the Caribbean, IDB, 2011
- Severin, Eugenio, Technologies for Education (TEd), A Framework for Action, IDB 2011
- Shaping the Education of Tomorrow: 2012 Full-length Report on the UN Decade of Education for Sustainable Development, DESD Monitoring & Evaluation – 2012
- Shaping The Future – Realising the potential of informal learning through mobile, GSMA mLearning, 2012
- Sharma, Sameer, ITU Connect A School, Connect A Community, ITU, 2012
- Shechtman Promoting Grit, Tenacity, and Perseverance Critical Factors for Success in the 21st Century, US DoE, OET, 2013
- Shuler, Carly, a.o., The future of Mobile Learning, Implications for Policy Makers and Planners, UNESCO, 2013
- Singapore: Masterplan 3 (2013)
- Silvernail David L., Erika K. Stump, More efficient schools in Maine, Learning Communities Building the Foundation of Intellectual Work, MEPRI, 2012
- Silvernail, David L., a.o., Maine Learning Technology Initiative: Impacts, Benefits and Costs of the School Laptop Program, MEPRI, 2011
- Song, Ki-Sang, 2010 ICT in Education Readiness Report: Lessons to Developing Countries, KNUE, 2011
- Status of ICT Integration in Education, SEAMEO, 2010
- Stichting ICT op School Jaarverslag 2003, 2004
- Sunkel, Guillermo, Daniela Trucco, New information and communications technologies for education in Latin America: risks and opportunities, CEPAL, 2011
- Suriname Cppetitiveness Agenda 2013, CUS, 2013
- Survey of Schools: ICT in Education SMART (ESSIE) 2010/0039, EU, 2012
- Survey of Schools: ICT in Education, Benchmarking Access, Use and Attitudes to Technology in Europe's Schools, EU 2013
- Swarts, Patti, Education 8 Policy Recommendations For the advancement of Knowledge Societies across Africa, GESCI, ALICT, 2012
- The League of Innovative Schools, Digital Promise, n.d.
- The MOECD-UNICEF Computer Aided Learning project, An introduction to the project and its current status, MOECD, UNICEF, 2012
- The Positive Impact of eLearning - 2012 UPDATE, Intel, 2012
- The Technology Factor, ProjectRED, n.d.
- Tjon-A-Loi, Faisel, Evidence-based curriculumontwikkeling in Suriname, Onderzoek naar de kwaliteit van het professionaliseringstraject en de curriculumproducten, SLO 2011
- Towards Knowledge Societies for Peace and Sustainable Development, First WSIS+10 Review Event, Final Recommendations, WSIS, 2013
- Transforming Education, The Power of ICT Politics, UNESCO, 2011
- Trucano, Michael, SABER-ICT, The World Bank, 2011
- Trujillo, T. & Rénee, M. (2012). Democratic School Turnarounds: Pursuing Equity and Learning from Evidence. NEPC, 2012.
- UNESCO Mobile Learning Week Symposium Report, UNESCO, 2013
- UNESCO policy guidelines for mobile learning, UNESCO, 2013
- USAID Forward, Progress Report, 2013

- Van der Hijden, Pieter, Ton Wolf, Technisch voorstel: Proefproject Bijscholing leerkrachten binnenland via modern afstandsonderwijs, ECOIS, 2010
- Varanasi, Raju, Process and Service Innovation Approaches to Increase Teacher and Student Proficiency in ICT, 2012
- Vergelijking internationale curricula basisonderwijs, Mogelijke implicaties voor het Surinaamse basisonderwijs, SLO, 2011
- (ver)rijk onderwijs, natuurlijk met ICT, Kennisnet, 2009
- Vier in balans monitor, Kennisnet, 2012 and 2013
- Voorstel tot gefaseerde vernieuwing van de opleiding', De Nieuwe Leerkracht. Directeurenoverleg van de PI's in samenwerking met PROGRESS, 2012
- VVOB jaarverslag 2011
- Vosloo, Steven, Mobile Learning and Policies, Key Issues to Consider, UNESCO 2012
- Wazir, Dereyl, Reframing Teaching and Learning Outcomes in Education with use of Technology, Study tour to Brunswick, State of Maine, USA, BEIP, 2013
- Weekers, Miriam a.o., Het Speciaal Onderwijs in de steigers, 2011
- West, Mark, Mobile Learning for Teachers: Global Themes, UNESCO 2012
- West, Mark, Turning on Mobile Learning: Global Themes, UNESCO 2012
- Woolfolk, A & M. Hughes & V. Walkup, Psychology in Education. Harlow: Pearson, 2008
- WSIS Stocktaking team WSIS Project Prizes, 2013

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MOECD Directorate development Services	Y. Dipotaroeno
MOECD OPM	Mevr. R. Leefland
MOECD Curriculum Development	Mevr. M. Brown
MOECD Schoolradio and -TV	Mevr. L. Trustfull
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MOECD Clusters	Mrs. Amattaram (Kwatta), Mrs. Hoogfliels (Parwasbo), Mr. Namdar (Leiding) and Mrs. Simons (Flotam)
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VVOB	N. Vromant
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Nucleuscenter Albina	Mw. Masangi (Director) and Claritsha Koendjibharie (ICT)
Erowarte School	Wensley Pelhan (headteacher)
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List of participants Kick Off meeting

Name	Organisation
Ir. Adhin, A.	Minister of MOECD
Adhin, U.	MOECD, BIB
Baank, T.	Kabinet V.P.
Banel, E.	EZ Eiban
Bergraaf, H.H.	MOECD
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Mijnals, S.	MOECD 2 nd BEIP
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Sardjoe, K.	MOECD BEIP
Sastropawiro, A.	MOECD
Sawirjo, J.	MOECD
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