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MINISTERE DE L'EDUCATION DE BASE

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MINISTRY OF BASIC EDUCATION

ICT in Education Policy and Strategic Framework for Basic Education in Cameroon

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This ICT in Education Policy and Strategic Framework for Basic Education in Cameroon was developed in collaboration with the Commonwealth of Learning (COL). COL is an intergovernmental organisation created by Commonwealth Heads of Government to promote the development and sharing of open learning and distance education knowledge, resources and technologies.

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FOREWORD

Information and Communication Technologies (ICTs) is at the centre of series of innovations taking place throughout the world. These technologies are revolutionising the information society and dramatically changing the teaching and learning process. Many new learning opportunities are opening up through innovative technologies and access to educational resources well beyond those traditionally available.

The challenge of providing schools with these modern technologies in order to enhance the quality of learning and teaching requires a significant investment. The Government alone cannot provide all schools with the required learning technology hence the need for a nationally accepted ICT Policy and Strategic Framework. This document is vital for the Ministry of Basic Education to ensure a coordinated approach towards the country's National Development Strategy 2030 Vision. It will provide the sub-sector with strategic direction, coordination capacity and resource identification for ICT in Education initiatives. The public and private sector will have to join hands to ensure that all children receive high-quality learning and teaching.

This Policy and Strategy document is based on the Government's recognition of knowledge as a necessary base for sustainable human development. It therefore reflects the framework for collaboration between the Government and the private sector, in the provision of ICTs in the basic education sub-sector.

As we seek to realise the benefits of the emerging technologies, the Ministry recognises the risk of increasing the knowledge gap, and so the policy pays special attention to the issues of access and equity as we expand the opportunities for lifelong learning for all our pupils, anytime and anywhere. Through this initiative, we hope to turn our schools into centres for quality learning and teaching in the twenty-first century.

We hope this policy and strategy framework will enable the sub-sector, Technical and Financial partners to ensure optimal availability and use of ICTs in the sector, in a way that will create better access to quality education for all, and bridge the digital divide, both within our country, and other parts of the world.

Professor Laurent Serge ETOUNDI NGOA
Minister of Basic Education

Pr. Laurent Serge ETOUNDI NGOA

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ABBREVIATIONS

ADSL	asymmetric digital subscriber line
CAMNOS	Cameroon Open School
CAMTEL	Cameroon Telecommunication Company
CE	Centre
CEP	Certificatd'ÉtudesPrimaires
CEL-Info	Computer Unit
DPPC	Directorate of Planning Projects and Cooperation
DRH	Directorate of Human Resources
DRFM	Directorate of Financial and Material Resources
EiE	Education Cannot Wait
EMIS	education management information system
ETSS	Education and Training Sector Strategy
FSLC	First School Leaving Certificate
GDP	gross domestic product
GER	gross enrolment rate
GPE	Global Partnership for Education
ICT	information and communication technologies
IDP	internally displaced persons
IFADEM	Initiative Francophone pour la Formation à Distance des Maîtres
IGE	Inspectorat General of Education
IP-ET	Inspectorate of Pedagogy in Charge of Educational Technology
ISP	Internet service provider
IWB	interactive whiteboard
LAN	local area network
M&E	monitoring and evaluation
MINEDUB	Ministry of Basic Education
MINPOSTEL	Ministry of Post and Telecommunication
NAICT	National Agency for Information and Communication Technology
N.W.	North West
ODeL	open,distance and e-Learning
ODL	open and distance learning
OER	open educational resources
PCR	primary completion rate
PAREC	Programme d'Appui à la Réforme de l'Éducation au Cameroun
PAQUEB	Project for the Amelioration of the Quality of Basic Education
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
S.W	South West
Wi-Fi	wireless fidelity
EPZ	Education Priority Zone

EXECUTIVE SUMMARY

This Information and Communication Technologies (ICTs) Policy and Strategic Framework was prepared by the Ministry of Basic Education (MINEDUB) in collaboration with stakeholders from the public andprivate, civil society and development partners. It seeks to reinforce the vision and mission of MINEDUBinterms of identifying how the basic education sub-sector will use ICTs to improve access, quality and equity in the delivery of basic education in Cameroon.

In 2007, the Minister of Basic Education announced the publication of the first ICT in educationpolicy and strategy document after a considerable period of stakeholder engagement. Since then, ICT has undergone considerable changes,thus necessitatinga review of that document to reflect the current situation. This updated policy and strategic plan is designed to serve as a catalyst for the changes needed to innovate the teaching and learning process while propelling the basic education sub-sector towards a very modern but still evolving sub-sector.

During the preparatory stages of this policy and strategy document, it was noted that the COVID-19 crisis posed a major threat to countries like Cameroon that have not fully developed ICT in education. Educational leaders, teachers and pupils saw the lack of ICT as a major weakness in the educational system — but they also saw that Cameroon must seize the opportunity offered by COVID-19 to build a resilient model of education. This model should be driven by various learning technologies capable of guaranteeing the continuity of education delivery in any situation.

The fact that the plan outlined in the 2007 ICT policy and strategy document was not fully implemented across the country hasraised some doubts not only about the sustainability of the ICT policy and strategy in the basic education sub-sector as presently formulated, but also about its applicability in the current context, where resources in general are scarce. The successful implementation of the present policy requires the government to draw on the public investment budget to build the required ICT infrastructure and equip schools with the requisite technologies.

This updated document is aimed at making the basic education sub-sector more relevant and pertinent than ever before. It will also guide the effective implementation of the policy and master plan in a sustainable manner by acknowledging the key issues encountered since 2007 and looking at lessons learned from the successes, challenges and failures. It looks at all the relevant aspects of the policy and strategy and considers the rapidly changing ICT landscape more broadly in order to offer specific prescriptive directives in a masterplan that should be seen and accepted as workable and implementable by all stakeholders.

The present challenges within the basic education sub-sector have been reviewedto ensure that appropriate strategies for this policy are defined. Existing policy and strategy documents for the sector have also been reviewed, ensuring attention to equity, access and quality, which are key priorities for the Education and Training Sector Strategy Plan. In defining the strategic use of ICTs to achieve developmental objectives for the basic education sub-sector, a number of strategic frameworks have been adopted. These have been used to reflect the basic education sub-sector's needs and priorities as they relate specifically to education.

Nine key components underpin the use of ICTs in the basic education sub-sector: infrastructure and connectivity development; human resources and capacity building in ICT; ICT in teaching, learning and assessment; ICT in school management and administration of initiatives; open educational resources development and distribution; sustainability, maintenance and support; support for local council initiatives and partnerships; open, distance and e-Learning development; and monitoring and evaluation.

1. INTRODUCTION AND BACKGROUND

1.0. Context

In the last ten years, information and communication technologies (ICTs) have been at the centre of most innovations in various sectors of society. Education, widely acknowledged as fundamental to development in any country, has been greatly affected by various ICTs. Much research has reported on how ICT in general is widening access to education, enhancing teaching and learning, and preparing citizens to meet the demands of 21st-century society.[1]There is evidence from both developed and developing countries that ICTs have enormous potential to influence knowledge creation, knowledge dissemination, knowledge acquisition, effective learning and the development of more efficient education services.[2] The government of Cameroon recognises the opportunities offered by ICT in terms of the creation of quality jobs, wealth generation and overall national well-being. In its National ICT Policy and Implementation Framework, enacted in 2007, Cameroon spells out an ambitious plan to transform the country "into an information rich-knowledge base and technology driven high income economy and society."[3] The framework document also notes that, in order for Cameroon to make visible progress in its socio-economic development efforts, substantial resources will be directed towards improving the delivery of education. The Education and Training Sector Strategy (ETSS) 2013–2020[4]outlines the key role that ICT can play in widening access to education, especially for pupils and other stakeholders located in rural communities, and the Ministry of Basic Education (MINEDUB)*ICT Policy and Strategy Document*, released in 2007,[5] highlights the importance of using ICT to equip pupils with the skills they need to thrive in the 21stcentury.

TheMINEDUBinspectorate in charge of educational technologies led the development of the first ICT policy and strategy document in 2007. Close to 14 years later, society has undergone many changes, and so a review of the achievements and progress is needed. The manner in which ICT was previously perceived has evolved, and so the current ICT policy and strategy document needs to be reviewed and updated accordingly. This revised ICT Policy and Strategic Implementation Framework builds on the 2007 version and the ETSS 2013–2020. The main purpose of this document is to provide a strategic framework and masterplan and to define the role of each stakeholder in the deployment of ICTs in the basic education sub-sector with a view to achieving the goals set out in the ETSS.

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[1] Tikam, M. V. (2013). Impact of ICT on education. *International Journal of Information Communication Technologies and Human Development (IJICTHD)*, 5(4), 1-9. http://doi.org/10.4018/ijicthd.2013100101

[2] Hong, J. (2010).*Nonaka's knowledge creation model: Universal or particularistic?* International Conference on Organizational Learning, Knowledge and Capabilities (OLKC) 2010, Boston, USA.

[3] Republic of Cameroon. (2007).*National policy for the development of information and communication technologies.*National Agency for Information and Communication Technologies, Cameroon.

[4]Republic of Cameroon. (2013). *Education and training sector strategy paper for 2013–2020.*MINEPAT, Cameroon. https://info.undp.org/docs/pdc/Documents/CMR/strat%C3%A9gie%20du%20secteur%20%C3%A9ducation.pdf

[5] Ministry of Basic Education. (2007).*ICT policy and strategy document*. Ministry of Basic Education, Cameroon.

1.1. Objectives and Scope of This Document

1.1.1. Objectives of this document

The fundamental objective of this ICT Policy and Strategic Implementation Framework is to ensure that ICTs are efficiently integrated into the basic education sub-sector to achieve the goals outlined in the ETSS. More specifically, this document provides:

- strategic direction to shape, regulate and monitor ICT initiatives in response to new national requirements and opportunities;
- a co-ordination framework for all stakeholders, since the use of ICT in and for education depends on a broad range of initiatives and stakeholders, not all of which are in the education sector; and
- guidance to mobilise the resources needed to realise the effective integration of ICT into the basic education sub-sector.

1.1.2. Scope of this document

In Cameroon, there are four distinct Ministries in charge of education: Basic Education, Secondary Education, Vocational Training and Employment, and Higher Education. The ICT in education policy and strategy discussed here is limited to the involvement of MINEDUB, whose mandate covers nursery and primary schools located in all ten regions of the country. The focus is on pupils' and teachers' practices related to the use of various ICTs in education.

1.2. Ministry of Basic Education

1.2.1. Structure

Cameroon has two sub-systems of education — English and French —and each has its own set of standards and values.[6]The state is the key provider of education, but other education partners do exist and are categorised as community schools, private and lay private education agencies. In this document, "private schools" will be used as an umbrella term to signify private and lay private education agencies. The educational system comprises three distinct cycles: nursery and primary; secondary; and tertiary.[7] The nursery and primary cycle is overseen by MINEDUB, as noted above, and is the focus of this policy and strategy document. Nursery school covers two years of schooling and primary school covers six years, divided into three levels. Level One is made up of Classes1 and 2,Level Two includes Classes3 and 4 and Level Three consists of Classes5 and 6. There is a national examination for both sub-systems at the end of the primary cycle —Class 6 for the Anglophone sub-system and Cour Moyen 2 in the Francophone sub-system —for pupils who wish to continue on to the secondary cycle. Candidates who are unsuccessful or who did not sit the entrance examinations but hold an end-of-primary cycle certificate —referred to as the First School Leaving Certificate (FSLC) in the Anglophone sub-system and Certificat d'Études Primaires (CEP) in the Francophone sub-system —may be able to gain access to certain secondary schools with less stringent admission policies.

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[6] Republic of Cameroon. (1998).*Law No.98/004 of 4th April to lay down guidelines for education in Cameroon*.Presidency of the Republic.

[7]Republic of Cameroon. (2013).*Education and training sector strategy paper for 2013–2020.*

1.2.2. Access

In the 2019/20 school year, a total of 567,181 pupils were enrolled in nursery education and 4,578,708in primary education, making a total of 5,145,889 learners enrolled in basic education in Cameroon. There are120,027 teachers for nursery and primary education combined, and 9,745 nursery and 19,517 primary schools across the country. Tables 1.1a and 1.1b show enrolment numbers by school type, education body and gender of learners and number of teachers by school type, education body and gender.

Table 1.1a: *School Enrolment for 2019/20: Number of Pupils by School Type, Education Body and Gender*

School type	Education body	Boys (%)	Girls (%)	Total
Nursery	Public	87,198 (49.88)	87,611(50.12)	174,809 (100)
	Private	188,213 (49.89)	188,986 (50.10)	377,199 (100)
	Community	7,634 (50.31)	7,539 (49.68)	15,173 (100)
Primary	Public	1,854,928 (53.62)	1,604,366 (46.37)	3,459 294 (100)
	Private	536,142 (50.37)	528,185 (49.62)	1,064,327 (100)
	Community	30,540 (55.44)	24,547 (44.56)	55,087 (100)

Source: MINEDUB (2020), *Statistical Yearbook*

Table 1.1b: *Staffing Levels for 2019/20: Number of Staff by School Type, Education Body and Gender*

School type	Education body	Female (%)	Male (%)	Total
Nursery	Public	87,198 (49.88)	87,611 (50.12)	174,809 (100)
	Private	188,213 (49.89)	188,986 (50.11)	377,199 (100)
	Community	7,634 (50.31)	7,539 (49.68)	15,173 (100)
Primary	Public	28,227 (47.78)	30,844 (52.23)	59,071 (100)
	Private	27,304 (67.38)	13,217 (32.62)	40,521 (100)
	Community	128 (16.95)	627 (83.04)	755 (100)

Source: MINEDUB (2020),*Statistical Yearbook*

Although some progress has been made in the past decade, enrolment and completion rates are still less than 100% — that is, there is still not universal nursery and primary education — and underlying disparities between population groups persist. According to the 2020*Statistical Yearbook*,[8] the primary completion rate (PCR) in Cameroon had increased by 1 percentage point, from 71% in 2010/11 to 72% in 2017/18.However, much effort is required if the country is to attain a 100% completion rate.[9] Retention in primary school remains a big challenge. Out of 100 pupils who enrol in Class 1, only 51 reach Class 6.[10]There are wide disparities in school attendance associated with gender and socio-economic factors. For example, net attendance for girls in rural areas is approximately 65%, compared to 79% for boys, and the overall gross enrolment rate (GER) among boys exceeds that of girls (139% compared to 129% in 2017/18). For the period spanning 2013–18,

[8]Ministry of Basic Education. (2020). *Statistical yearbook*. Republic of Cameroon. http://minedub.cm/index.php?id=132&id=132&L=1

[9]Republic of Cameroon. (2013*). Education and training sector strategy paper for2013–2020.*

[10]Republic of Cameroon. (2019). *Diagnosis of the education and training sectors in Cameroon*. MINEPAT, Cameroon.

the transition rate between primary and secondary school for both boys and girls was below the projected figure of 69%. Education Priority Zones (EPZs) and rural areas demonstrate lower service delivery and poorer education outcomes. For example:

- the PCR for the country as a whole increased from 71% in 2011 to 72% in 2018,
- the PCR for girls throughout the country increased from 67.3% in 2011/12 to 70.3% in 2014/15, and
- the PCR for girls in EPZs increased from 59% in 2011/12 to 63.6% in 2014/15.

1.2.3. Equity

Cameroon's education sector faces a number of major challenges, including regional and gender-based disparities in access to basic education. For example, opportunities to access schooling are lower for girls in general and for all pupils in rural communities. Only about 20% of school-aged children in rural communities have access to education. Gender disparities to the detriment of girls appear at the start of primary school and persist throughout the education cycle.[11]Only 44% of girls and 52% of boys of entry age for lower-secondary education actually enrol. The data show that, while rural dwellers account for nearly 52% of the total 5–24-year-old population, they represent 81% of young people who have never been to school. Almost 77% of out-of-school children come from the poorest households in rural communities. While100% of children from rich families have access to school, it is estimated that only 76% of children from poor families have similar access. As a direct consequence of such disparities, there are inequalities in the appropriation of resources allocated to education: 10% of the most educated children benefit from about 33% of public education resources.

The recent influx of refugees (approximately 248,000 from the Central African Republic and 91,000 from Nigeria) and the presence of approximately 242,000 internally displaced people (IDPs), including school-aged children, in the eastern and northern regions (Far North, North and Adamawa) of the country have exacerbated existing inequalities in access to education.[12] From a national perspective, there is inequitable access to education in general in addition to regional and gender disparities. Even though there has been an increase in primary school enrolment, girls' participation in school lags behind that of boys. Over the past 15 years, the school-aged population has grown by approximately 2.5% annually. The total number of students enrolled across all levels of education is now more than 5.7 million, of whom almost 3.6 million are enrolled at the primary level. In 2017/18, girls accounted for only 46.9% of enrolments at the primary level, while boys accounted for 53.1%. Moreover, wide gender disparities exist in school attendance, with 65% net attendance among girls in rural areas, compared to 79% among boys in rural areas. Poverty, household responsibilities, poor pedagogical practices and early marriage are some of the primary factors driving these gender disparities.[13]

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[11]World Bank. (2019). *Re-examining sources of growth: The quality of basic education*. https://www.worldbank.org/en/country/cameroon/publication/cameroon-economic-update-reexamining-sources-of-growth-the-quality-of-basic-education

[12]International Organization for Migration. (2017). *Cameroon displacement report for Far North Region, Round 9 for the month of August*. United Nations Central Emergency Response Fund. https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/assessments/cmr_dtm_rd_9_report_en_final1.pdf

[13] Republic of Cameroon. (2020). *Diagnosis of the education and training sectors in Cameroon*. MINEPAT, Cameroon.

There are also considerable regional disparities in educational outcomes. These disparities are most pronounced in the three northern regions, the East region and rural areas. Indicators on school enrolment for 6- to 11-year-olds and on literacy rates for 15-year-olds and older reflect these disparities. Several non-EPZ areas —for example, remote and hard-to-reach areas such as Bakassi —and rural areas generally demonstrate lower educational outcomes compared to urban areas.

Primary school enrolment for children in Indigenous communities, including Bororo children, is very low (48.3% of Bororo children do not attend school), particularly among girls, with large numbers of children lagging years behind their peers at the primary level. Dropout rates for Bororo children remain high. Nomadic lifestyles, cultural beliefs that undermine female participation in schools, severe poverty, and humiliation and bullying inflicted by classmates and teachers are some of the social and economic factors that discourage education among Indigenous peoples.

1.2.4. Quality

A recent World Bank report commented that for Cameroon to become a middle-income nation as envisaged by the government's Vision 2035 plan, there should be an emphasis on basic education: "While access to basic education in Cameroon has improved considerably with primary completion rates moving from 71% in 2011 to 72% in 2018, academic performance has, nonetheless, declined."[14]

The report also referenced a2010 study conducted by MINEDUB which showed that "49% of pupils in their third year of primary school struggled to read, while 27% could not read at all." It noted that these figures indicate an "urgent need for Cameroon to improve the quality of its education." In 2018, the World Bank Cameroon Education Reform Support Project reported that the country would not achieve universal primary education —that is, 100% enrolment — by 2020 as envisaged in the *Education and Training Sector Strategy Paper for 2013–2020*.[15]Two reasons were given: first, the primary completion rate scorecard witnessed only a 1 percentage point increase, from 71% to 72%,between 2011 and2018; and second, an assessment of learning achievements in reading and mathematics for Class 5 pupils show a drop of about 4 percentage points in the average mathematics score and 12 percentage points in the average reading score between 1996 and 2005.[16] These findings were corroborated by a 2017 study on learning achievement conducted by the government of Cameroon. The findings of that study revealed that more than 50% of learners were unable to demonstrate the expected competencies for their school year level in reading and mathematics.[17]

There are also disparities between the English and French systems in the number of pupils who repeat a year of schooling. In the French sub-system, it is more common for pupils to repeat a year than to drop out, which means that reducing the number of pupils who repeat a year would significantly improve efficiencies in the use of the resources mobilised and allocated in the education sector. Conversely,

[14]World Bank. (2019).*Re-examining sources of growth: The quality of basic education.*

[15]Republic of Cameroon. (2013). *Education and training sector strategy paper for 2013–2020*.

[16]World Bank. (2016). *Cameroon — Francophone Africa results monitor: Basic education (English)*. World Bank Group. http://documents.worldbank.org/curated/en/933111481551086691/Cameroon-Francophone-Africa-results-monitor-basic-education

[17]Ministry of Basic Education. (2018). *Learning achievement report*. Republic of Cameroon.

in the English sub-system, the number of dropouts compromises the efficient use of resources. The dropout rate in this sub-sector may be related to the closure of schools in the North West and South West regions due to chronic socio-economic crises in the two dominant English-speaking regions in the past four years. Overall, the internal efficiency of resource use in primary education is relatively lower as compared to other cycles of education in Cameroon: 47.2% of resources allocated to primary education are "wasted" due to repetitions and dropouts. A World Bank report highlights three key factors that contribute to poor learning outcomes in Cameroon: poor teacher quality, shortage of textbooks and other instructional materials, and insufficient public financing of the sub-sector.[18]

Poor teacher quality: Teacher quality is low because of a shortage of qualified state-paid teachers, poor teacher deployment (i.e. teachers are not always sent to schools where there is a shortage of teachers) and sub-optimal teacher training, which negatively impacts the quality of teaching and learning in primary education. The continuing increase in pupil enrolment, combined with high levels of teacher attrition—due to a combination of teachers retiring and being hired by other public agencies—has resulted in Parents and Teachers Associations hiring more community teachers (maîtres des parents) whose salaries are paid by parents.

Shortage of textbooks and other instructional materials: While access to textbooks is an acute challenge in many Sub-Saharan African countries, the textbooks-to-pupil ratio in Cameroon is among the lowest in the world, with an average of one textbook per 12 pupils in primary schools.[19] The principal causes of this figure are:

- the high cost of textbooks, which is incurred mainly by families,
- the limited availability of textbooks outside major cities, and
- the poor quality of textbooks in terms of both their content and the materials used to produce them.

However, between 2016 and 2018,1,090,184 reading and mathematics textbooks were distributed to Primary 1; 1,300,000 to Primary 2; and 680,000 to Primary 3 across the Francophone and Anglophone systems. The pupil-to-textbook ratio for these levels thus improved substantially from a baseline of 12:1 to an end line 3.3:1, just short of the end-of-project target of 3:1. Classes 4–6are yet to benefit from the initiative.[20]

Insufficient public financing: Despite recent efforts to increase budget allocations to the sector, public spending on education remains inadequate. In 2016, the GDP per capita allocation for education in Cameroon was approximately 3.2%. Moreover, between 2010 and 2016, the share of the national budget allocated to the education sector represented, on average, only 14.2% of the total

[18]World Bank. (2018). *Cameroon — Education reform support project (English)*. World Bank Group. http://documents.worldbank.org/curated/en/991921525399281987/Cameroon-Education-Reform-Support-Project

[19]UNESCO. (2016). *Every child should have a textbook*. Global Education Monitoring Report, Policy Paper 23. https://en.unesco.org/gem-report/every-child-should-have-textbook

[20]Republic of Cameroon. (2020). *Diagnosis of the education and training sector in Cameroon.*

executed public expenditure, more than 5 percentage points below the Global Partnership for Education (GPE) benchmark of 20%.[21]

1.3. Pedagogic Supervisors System and Teacher Development

1.3.1. Pedagogic supervisors system

According to the Organisational Chart for the Ministry of Basic Education,[22] the pedagogic supervision system of the Ministry comprises several levels that stream from the central service down to the classroom. Each level is an essential component of the system and complements the other levels, all of which have specific tasks and responsibilities. At the central service, the Inspectorate General of Education, assisted by five Inspectors of Pedagogy, is responsible for defining innovative pedagogic approaches, evaluation methods and teaching methods. The inspectors also perform pedagogic supervision and inspection; explore scientific research results from universities and other research centres; request studies on issues related to pedagogy, test evaluation and andragogy; and adapt the educational system in accordance with technological and scientific developments. The regional level oversees all pedagogic activities and ensures the overall implementation of pedagogic innovations, system coherence and unity of action throughout the system. The pedagogic supervision chain spans the regional, divisional, sub-divisional and classroom levels, each of which has specific responsibilities.

1.3.2. Teacher development

In the basic education sub-sector, the pedagogic supervision chain is responsible for teacher training at every level. A 2019 World Bank report notes that the training model in place has inadequate practical activities and has therefore contributed to the generally poor quality of graduates from teacher training institutions.[23] A good teacher training model should pay particular attention to the effective use of teaching and learning materials through hands-on experience to ensure student teachers grasp the complexities involved in building pupils' basic literacy and numeracy skills.

The current trend in teacher development focuses on transmitting content to learners and completing curricula and syllabuses without any emphasis on the quality of learning outcomes. This is why there are high repetition rates and poor pupil performance in Cameroon's primary schools. Some researchers have therefore proposed that a good pre-service teacher programme should consist of four key elements: selection pattern, programme design pattern, specific duration and certification.[24]These points combined offer solid evidence that the state should look seriously at ongoing upgrading of teachers' skills.

A new curriculum developed with the support of the Islamic Development Bank was validated in 2018,[25]and the World Bank, under the Cameroon Education Reform (PAREC) Project, is helping

[21]Republic of Cameroon. (2020). *Diagnosis of the dducation and training sector in Cameroon.*

[22] Republic of Cameroon. (2012).*Organisational chart of the Ministry of Basic Education*.Presidency of the Republic.

[23]World Bank. (2019).*Re-examining sources of growth: The quality of basic education*.

[24] Tambo, I. L. & Tchombe, T. M. (1997). *Cameroon education project V: Practices and models of teacher education in Cameroon*[Unpublished sponsored project report].World Bank

[25]Republic of Cameroon. (2018). *Cameroon primary school curriculum*. Ministry of Basic Education. http://www.minedub.cm/uploads/media

MINEDUB to update teachers' skills to effectively implement the new curricula for nursery and primary education. It is hoped that the new professional development programme will greatly enhance teachers' skills and serve as the basis for implementing the new curriculum, which is the government's current priority.

1.4. Curriculum and Material Development

In 2018, MINEDUB published a new curriculum for nursery and primary education. It emphasises the development of learners' knowledge, skills and attitudes in seven National Core Skills:

1. **Communication in the two official languages (English and French) and the use of at least one national language**
   Communication in English, in French and in at least one National Language implies the ability to use the four language skills of these languages. The learner should be able to listen, communicate orally, and be able to read and to write. The language competence is a prerequisite for access to other core skills.
2. **Use of basic notions in Mathematics, Science and Technology**
   Introducing notions of Mathematics, Science, and Technology involves the acquisition of knowledge, skills and attitudes in these subject areas and the ability to use them to address challenges in real life situations.
3. **Practice of Social and Citizenship Values (morality, good governance and budgetary transparency)**
   This involves inculcating patriotic, moral, citizenship and values of good governance in the learners of both cycles so as to prepare them for a harmonious insertion into the society.
4. **Demonstration of the Spirit of Autonomy, a Sense of Initiative, Creativity, and Entrepreneurship**
   Developing this competence in the learner calls for the assembly of multidisciplinary knowledge and skills in view of developing the learners' social integration skills, creativity as well as managerial and entrepreneurial potentials.
5. **Use of Basic Information and Communication Technology Concepts and Tools**
   Generally, this core skill requires the use of information and communication technology tools in school and in society. It is related to healthy, safe and responsible use of various ICT devices for learning and for leisure activities. In addition to this, it develops logical and critical thinking, automated management of information (analysing, summarizing, and assessing), and apt communication skills.
6. **Practice of Lifelong Learning**
   This implies that the learner will demonstrate the desire and the will to undertake and continue education, organize self, especially through efficient time and information management, individually or in groups.
7. **Practice of Physical, Sports and Artistic Activities**
   This competence provides learners with a platform to develop their physical, psycho-motor, artistic, personal and interpersonal skills as well as improve their well-being. It enables them to acquire knowledge, skills and attitudes required for their participation in several physical,

psycho-motor, sports and leisure activities in order to strengthen social harmony and ensure a healthy lifestyle.[26]

In addition to the above, pupils should also master four broad-based competences:

1. **Intellectual competences**

Intellectual Competences include**:**

- exploiting information
- solving problems
- acquiring logical thinking and a sense of observation
- exercising critical judgement
- practising creative and innovative thinking

2. **Methodological competence**

Methodological competences include:

- giving oneself efficient working methods
- exploiting information and communication technologies
- organizing one's learning
- arousing the desire to learn each subject

3. **Personal and interpersonal competences**

Personal and interpersonal competences enable the learner to:

- develop his/her personality
- acquire abilities in view of his/her socio-cultural integration and individual fulfilment
- cooperate with others

4. **Communication competences**

Communication competences enable the learner to:

- communicate appropriately in the two official languages
- communicate in at least one national language[27]

The core skills are developed through five domains of learning, each of which is allocated a percentage of the overall learning time outlined in the national curriculum:

- Basic knowledge: 60%
- Vocational and life skills: 20%
- Digital literacy: 10%
- Communal life and national integration: 5%
- Cultural identity: 5%

It is important to note that the subject areas are the pathways through which the competences in each domain and broad skills are developed.

[26] Republic of Cameroon. (2018). *Cameroon primary school curriculum*, pp. 13–14.
[27]Republic of Cameroon. (2018).*Cameroon primary school curriculum*,p. 14.

Instructional materials to support the effective implementation of the curriculum are developed by the Inspectorate General of Education. However, they are largely inadequate because of insufficient funding. Furthermore, the exploration of open educational resources (OER) is relatively new to the sector. Although a few attempts to use OER have been made with the support of the Commonwealth of Learning (COL), uptake and implementation has been very slow. Research shows that the poor adoption of OER is due to teachers' lack of skills in this area.[28]

1.5. ICT in Education: Policy and Implementation

1.5.1. Policy document

In 2007, MINEDUB enacted an ICT policy and strategy document to guide the integration of ICT in teaching and learning.[29] The policy document was based on guidelines from the National Policy for Information and Communication Technology in Cameroon.[30]The objectives of that policy were to:

- promote equitable access to educational resources through the strategic application of ICT and ensure that all pupils and teachers within the basic education sub-sector have equitable access to ICT resources;
- make all primary school leavers computer literate, thereby providing them with the ICT skills required to participate in education and/or entry to specialised training for the information economy;
- create not only a teaching force in which all practitioners possess the critical skills and competencies required to use ICT as a tool to enhance the teaching and learning process but also a pool of teachers who are qualified to teach others how to use ICT in teaching;
- improve the efficiency and effectiveness of educational administration by promoting the use of appropriate school management information systems;
- exploit the interactive potential of ICT in the provision of lifelong learning anytime, anywhere via distance education programmes;
- create smart partnerships for a sustainable ICT programme through collaboration with the public, private and community sectors;
- establish a schools' network system for the collaborative sharing of educational resources and stakeholder participation;
- employ ICT tools for increased online communication and stakeholder participation and improved management of the sector;
- foster the concept of lifelong learning among pupils, teachers and the general population of the country;
- encourage head teachers, teachers and pupils within the basic education sub-sector to be involved in the development of applications and to use ICT meaningfully in order to enhance the teaching-learning process;
- demonstrate the Ministry's intention of providing a reasonable level of computer literacy to all pupils and teachers in the sub-sector;

[28]Nkwenti, M., & Abeywardena, I. (2019). OER mainstreaming in Cameroon: Perceptions and barriers. *Open Praxis*, 11(3), 289-302. doi: http://dx.doi.org/10.5944/openpraxis.11.3.981

[29]Ministry of Basic Education. (2007). *ICT policy and strategy document.*

[30]Republic of Cameroon. (2007). *National policy for information and communication technology in Cameroon.*

- encourage and facilitate the use of the Internet as a research and communication tool among pupils, parents, teachers, head teachers, other officials and members of the community;
- facilitate the implementation of an education management information system (EMIS) to ensure the effective management of the basic education sub-sector;
- encourage partnerships between the various stakeholders in the basic education sub-sector;
- provide an avenue for increased electronic networking among educators in Cameroon and overseas; and
- foster greater professional development opportunities for all educators.

To achieve the outlined objectives, seven pillars were formulated:

- Frame working and preparation for ICT initiatives
- Infrastructure and readiness
- Training
- Using ICT in the curriculum
- Using ICT in administration
- Sustainability, maintenance and support
- Evaluation of ICT initiatives

Each pillar has guiding principles and statements to facilitate its implementation.

In 2017, COL supported the Ministries of Basic Education and Secondary Education in developing guidelines to adopt OER in teaching and learning.[31]

1.5.2. Implementation strategy

To achieve the outlined objectives in the policy document, an implementation strategy document based on the seven key pillars of the policy was formulated. The pillars themselves had been formulated to achieve a vision: an educational system that produces pupils who are capable not only of functioning effectively in the Information Age but also of contributing meaningfully to its further development. With a vision formulated, a list of assumptions, obstacles and risks was drafted, accompanied by a mitigation framework. Thereafter, 20strategies based on the seven pillars in the policy document were formulated.

With clear policy objectives and strategies in place to develop the adoption of ICT across the school curriculum, the government and its development partners are gradually equipping schools with the required ICT resources. However, problems persist. Schools with no electricity, computers or Internet connection continue to be left behind. Teachers who have access to ICT in their schools underuse the resources for instructional purposes. Pupils from wealthy backgrounds who have access to computers and an Internet connection at home are more technology-savvy than their teachers. These pupils pose many challenges for their teachers when it comes to using technology in the classroom because they are confident in their technology skills and knowledge and may

[31] Nkwenti, M. (2017). *Regional OER guidelines: Cameroon*. Commonwealth of Learning. http://oasis.col.org/handle/11599/2673

behave disrespectfully towards their teachers, who have a lower level of skills and knowledge.[32] Teachers' inability to handle this category of pupils has been largely blamed on inadequate professional development to equip teachers with more knowledge than their students. The lack of technical skills among teachers and lack of technological resources in general significantly inhibits the use of ICT tools in teaching and learning.

In an attempt to overcome the challenge presented by teachers' lack of technical skills, in2011 MINEDUB began providing some funding for the training of teachers and pedagogic supervisors on the use of ICT in the classroom. However, the funding only covered training fora small number of teachers. With the support of the Islamic Development Bank, MINEDUB constructed computer rooms in 51 primary schools located in six regions of Cameroon. These computer rooms were equipped with a total of 4,617 XO laptops acquired under the One Laptop per Child initiative. The project was initially expected to begin in 2010, so teachers in the schools involved in the project and their pedagogic supervisors received professional development in ICT skills that same year. However, because the project was delayed by two years, the teachers and pedagogic supervisors received further training during the eventual deployment of the tools in the classroom.

Although most schools have not been equipped with ICT tools, ICT knowledge has regularly been assessed in the First School Leaving Certificate Examination and the Certificat d'Études Primaires as an optional paper since 2010. The assessment has been limited to ICT knowledge with no testing of practical skills, despite a real-life need for pupils who can use ICT as a productive tool. Pupils who score above the average of 10/20 have their mark added as a bonus to their total scores from other subjects.[33] Though it is limiting to possess only ICT knowledge and not practical skills acquired from hands-on experience, this assessment represents a milestone, one that needs to be followed up with effective teacher professional development and the introduction of the required technology in schools.

1.6. Distance and Online Learning

In MINEDUB, distance education was first introduced by the Inspectorate of Pedagogy in charge of Educational Technology in 2009during a workshop that brought together experts from the different Ministries of Pre-University Education.[34]During this workshop, a strategic framework for the development of Cameroon Open School (CAMNOS) was drafted with the help of a consultant, funded by COL.[35] Unfortunately, the idea was not developed and no open school was created. In 2014, the Inspectorate of Pedagogy then attempted to adopt a distance learning mode for professional development for teachers, but the idea petered out in 2016 due to lack of funding. In 2019, a similar initiative from the Organisation Internationale de la Francophonie, L'Initiative francophone pour la formation à distance des

[32]Ministry of Basic Education. (2017; 2018; 2019).*Inspectorate of Pedagogy in Charge of ICT annual report*. Republic of Cameroon.

[33]Ministry of Basic Education. (2010). *Order integrating ICT in the school curriculum*. Republic of Cameroon.

[34]Ministry of Basic Education. (2009).*Workshop report on the drafting of open school strategic plan*[Unpublished report].Republic of Cameroon.

[35]Republic of Cameroon. (2009). *Cameroon national open school strategic plan*[Unpublished report]. Republic of Cameroon.

maîtres (IFADEM), was introduced,[36]but no progress has been made since.

When the 2019/20 school year was entering the penultimate week of the second term, COVID-19 was declared a pandemic. The government of Cameroon took a series of preventive measures aimed at curbing the spread of the virus in the country, including shutting down schools. As a result, more than 7 million children were left without access to education; of those, an estimated 1.2 million had been preparing to sit their final exams. The outbreak of the pandemic exacerbated the ongoing crisis affecting the North-West and South-West regions, where many school-age children already had limited access to regular classes. MINEDUB, in collaboration with UNESCO and other technical and financial partners, identified distance learning through television, radio and the Internet as an alternative way to deliver continuous learning. Funds were raised from Global Partnership for Education (GPE) and Education Cannot Wait (EiE) to develop alternative modes of learning delivery for all nursery and primary school pupils. This initiative is ongoing but lacks regulatory instruments that could involve all stakeholders in the process.

[36]République du Cameroun. (2019). *Premier atelier de conception des contenus de formation pour les enseignants du primaire*. Ministry of Basic Education, Cameroon. https://www.auf.org/afrique-centrale-grands-lacs/nouvelles/actualites/cameroun-premier-atelier-de-conception-contenus-de-formation-enseignants-primaire/

2. CURRENT STATUS OF ICT IN THE BASIC EDUCATION SUB-SECTOR

This chapter presents the findings from two surveys administered under MINEDUB to head teachers and teachers in public, private and lay private schools. The surveys, which assessed several dimensions of ICT integration in education, were sent out to 700 head teachers and 1,000 teachers. In total, 586 head teachers responded, yielding an 83.71% response rate, but not all the head teachers responded to all the test items. This will be observed in the analysed data. While the reasons for not responding to all the test items are unclear, it is believed that the respondents did not have a response for the questions. Of the 1,000 teachers approached, 852 responded, representing a response rate of 80%.However, not all the teachers answered all the survey questions either. To gather the pupils' perspective, ten pupils were interviewed using open-ended questions. The data gathered are representative of the overall situation of primary schools in Cameroon and provide valuable insights for developing a draft ICT in education policy and strategy.

2.0. Participating Regions, School Location, and Gender, Age Range, Experience and Socio-economic Background of Participants

Table 2.1indicates the number of schools that participated in the survey, broken down into a variety of categories. A total of 852 schools took part in the survey: 98 private schools, 561 public schools and 23 lay private schools;164 schools did not indicate their school type. The schools were randomly selected from three socio-economic locations as follows: 44.60% were urban schools because of the school density in urban areas,16.62% were drawn from semi-urban areas and 29.92% were drawn from rural areas. Rural area shave more schools than semi-urban areas because most of Cameroon is still rural.

The survey targeted head teachers and teachers. Of the 586head teachers who participated in the survey, 284 were male, 293 were female and nine did not indicate their gender. Of the 852 teachers who participated, 279 were male,568 were female and five did not indicate their gender. Regarding the age range, 43.3% of the head teachers are within the 46–55years age range. The teachers are even younger, with 46.2% falling within the 36–45 years age range. The data further indicate that 33.53% of the head teachers have three to five years' experience and 40.42% of the teacher shave between 11 and 20 years' experience. This indicates that the teachers are experienced in their profession. Regarding socio-economic background, almost54% of the surveyed head teachers reported that more than 50% of their pupils come from a deprived home.

Table 2.1: *Participating Regions, School Location, Gender, Age Range, Experience and Socio-economic Background of Participants*

Participating regions										
AD	**CE**	**East**	**Far North**	**Littoral**	**North**	**N.W.**	**West**	**South**	**S.W.**	**Total**
37	120	35	110	176	76	70	84	71	113	**852**
School type										
Private			**Public**			**Lay private**			**Not indicated**	
98			561			23			164	
School location										
Location type					Frequency (%)					
Urban area					380 (44.60)					
Semi-urban area					142 (16.66)					
Rural area					255 (29.92)					
Not indicated					75 (8.80)					
Gender of head teachers and teachers										
Head teachers						***Teachers***				
Gender			Frequency (%)			**Gender**		Frequency (%)		
Male			284 (48.5)			**Male**		279 (32.7)		
Female			293 (50)			**Female**		568 (66.7)		
Not indicated			9(1.5)			**Not indicated**		5 (0.5)		
Total			**586**			**Total**		**852**		
Age range of head teachers and teachers										
Head teachers						***Teachers***				
Age range (years)			*Frequency (%)*			*Age range (years)*			*Frequency (%)*	
≤ 30			13 (2)			≤ 30			45 (4.9)	
31–35			47 (7.3)			31–35			113 (12.4)	
36–45			228 (35.3)			36–45			420 (46.2)	
46–55			281 (43.3)			46–55			288 (31.6)	
≥ 55			77 (12)			≥ 55			288 (31.6)	
Professional experience as head teacher						**Teaching experience as teacher**				
Years of experience			*Frequency (%)*			*Years of experience*			*Frequency (%)*	
< 3			107 (16.16)			< 3			6 (0.7)	
3–5			222 (33.53)			3–5			163 (19.15)	
6–10			164 (24.77)			6–10			273 (32.07)	
11–20			143 (21.60)			11–20			344 (40.42)	
≥ 21			26 (3.92)			≥ 21			65 (7.64)	
Enrolment and socio-economic background										
Number of pupils and teachers in the schools surveyed						***Pupils' socio-economic background: Percentage of pupils from deprived homes***				
						Percentage of pupils			*Frequency (%)*	
Boys			102,441			0–10%			82 (14.74)	
						11–25%			86 (15.46)	
Girls			129,186			26–50%			110 (19.78)	
Teachers			4,491			>50%			299 (53.77)	

2.1. School ICT Infrastructure

2.1.1. Equipment

Table 2.2 shows rates and levels of access to ICT infrastructure during the 2020/21 school year. It can be observed that a majority of the respondents have no access to ICTs and connectivity is still a major issue in most schools, which raises concerns about the digital divide.

Table 2.2: *Access to ICT infrastructure*

Access to infrastructure	No access	Access on demand	Permanent access	Other
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Desktop computer without Internet access	229 (55.72)	100 (24.33)	34 (8.27)	48 (11.68)
Desktop computer with Internet access	261 (64.13)	92 (22.60)	17 (4.18)	37 (9.10)
Non-Internet-connected laptop, tablet PC, netbook or mini notebook	203 (50.25)	105 (26.00)	51 (12.62)	45 (11.14)
Internet-connected laptop, tablet PC, netbook or mini notebook	222 (54.28)	111 (27.14)	35 (8.56)	41 (10.02)
Digital reader (portable device to read)	197 (49.13)	98 (24.44)	66 (16.46)	40 (9.98)
Books, newspapers, etc. (on screen)	145 (35.71)	123 (30.30)	100 (24.63)	38 (9.36)
Mobile phone provided by the school	307 (76.56)	37 (9.23)	24 (6.00)	33 (8.23)
Interactive whiteboard	308 (78.00)	34 (8.61)	27 (6.84)	26 (6.60)
Digital camera	286 (71.14)	57 (14.18)	31 (7.71)	28 (7.00)
Data projector	326 (81.09)	38 (9.45)	15 (3.73)	23 (5.72)

2.1.2. Deployment

Table 2.3 shows the number of desktop computers installed for pupils to use for educational purposes either alone or with a teacher in various locations in the school. The data indicate a disparity in response rates because the respondents did not answer all the survey questions. However, the data also indicate not only that the number of desktop computers installed in different locations is still very low but also, and more alarming, that many schools have no computers. Furthermore, the data indicate that a majority of the participating schools have no interactive whiteboards (IWBs). Based on the number of pupils and teachers in the surveyed schools, it can be assumed that the pupil-computer ratio and teacher-computer ratio are both very high.

Table 2.3: *Total Number of Devices Installed for Educational Purposes*

Desktop computers								
	Computers in laboratories		Computers in classroom		Computers in library		Computers in other places	
Number of computers	**Number**	**%**	**Number**	**%**	**Number**	**%**	**Number**	**%**
0	484	91.67%	509	97.70 %	493	96.10 %	464	91.34 %
1–20	35	6.63%	11	2.11%	17	3.31%	42	8.27%
21–40	6	1.14%	0	0.00%	2	0.39%	1	0.20%
41–60	0	0.00%	0	0.00%	1	0.19%	1	0.20%
61–80	2	0.38%	0	0.00%	0	0.00%	0	0.00%
81–100	1	0.19%	1	0.19%	0	0.00%	0	0.00%
Interactive whiteboards								
	IWBs in laboratories		IWBs in classroom		IWBs in library		IWBs in other places	
Number of IWBs	**Number**	**%**	**Number**	**%**	**Number**	**%**	**Number**	**%**
0	512	96.97%	511	98.27 %	507	98.64 %	492	95.16 %
1–20	15	2.84%	9	1.73%	7	1.36%	24	4.64%
21–40	1	0.19%	0	0.00%	0	0.00%	0	0.00%
41–60	0	0.00%	0	0.00%	0	0.00%	1	0.19%
61–80	0	0.00%	0	0.00%	0	0.00%	0	0.00%

81–100	0	0.00%	0	0.00%	0	0.00%	0	0.00%

2.1.3. Maintenance of school ICT devices

Table 2.4summarisesinformation about who is responsible for maintaining school computers. The data show that a majority of schools outsource the maintenance of their computers to external companies. Only a few teachers in the surveyed schools have the requisite computer maintenance skills to undertake this responsibility.

Table 2.4: *Maintenance of School Computers*

People responsible for maintenance of school computers	Yes	No
	Frequency (%)	Frequency (%)
The school's staff	96 (55.93)	150 (21.31)
An external company contracted by the school	33 (18.64)	60 (8.52)
An external unit arranged by educational authorities (at local or regional level, etc.)	12 (6.77)	294 (41.76)
Other	36 (20.34)	200 (28.41)

2.1.4. Connectivity

Table 2.5indicates the Internet connection types and speeds in the schools surveyed. At a glance, it can be observed that very few schools have access to the Internet. Among those that do have connectivity, the connection speed is still very low.

Table 2.5: *Broadband Speed and Connection Type for the Surveyed Schools*

Internet connection speed	Number of schools
144kbps (excl.) – 2mbps (incl.)	27
2mbps (excl.) – 5mbps (incl.)	6
5mbps (excl.) – 10mbps (incl.)	7
10mbps (excl.) – 30mbps (incl.)	4
30mbps (excl.) – 100mbps (incl.)	3
Greater than 100mbps	0
Schools not connected via broadband	417
Connection type and number of subscribers	
Internet connection type	**Number of subscribers**
ADSL	33
Cable	44
Optic Fibre	48
Wireless LAN	119
Satellite	49

2.1.5. School connectivity

Table2.6 shows the connectivity status for the surveyed schools. From the data, it can be observed that 30 schools have a publicly accessible website; in 51 schools, more than 50% of teachers and pupils have email addresses. Seventy schools provide access to email through their local area network (LAN), and of those,65 say that they connect to their Wi-Fi through their LAN. Regarding the availability of a virtual learning environment, 35 schools said they have one that can be accessed from inside and outside of the school environment by teachers, parents and pupils. Eighteen schools reported that they do not have such a platform.

Table2.6:*School Connectivity*

Test items	Number of schools
Schools with publicly accessible homepage or website	30
School with email addresses for more than 50% of teachers	51
School with email addresses for more than 50% of pupils	19
Schools with a LAN through which users can access webpages and emails	70
Schools with a LAN which can also be access through wireless (Wi-Fi)	65
Schools with a virtual learning environment (i.e. platform or knowledge management system, etc.) that can be accessed:	35
• from outside the school by pupils	31
• from outside the school by teachers	46
• from outside the school by parents	37
• from outside the school outside school hours	38
Schools with none of the above items	18

2.2. Support for Teachers Using ICT

2.2.1. Professional development

Table 2.7 indicates the number of teachers who had under taken any professional development in the past two years (2019 and 2020) in certain ICT-related areas. From the data, it can be observed that a majority of the head teachers who participated in the survey reported that their teachers have not had access to professional development programmes. Of the teachers who did participate in training, the majority focussed on introductory courses, pedagogic use of ICT and other (i.e. unspecified) professional development programmes. In addition, the majority reported that the duration of the professional development programme was very short.

Table 2.7: *Number of Teachers Who Undertook Any Professional Development Training in the Past Two Years (2019/020) and the Duration of the Training*

ICT training	Frequency (%)	
	Yes	No
Introductory courses on Internet use and general applications (basic word processing, spreadsheets, presentations, databases, etc.)	204 (51.26)	194 (48.74)
Advanced courses on applications (advanced word processing, complex relational databases, virtual learning environments, etc.)	111 (27.89)	287 (72.11)
Advanced courses on Internet use (creating websites/home pages, video conferencing, etc.)	97 (24.50)	299 (75.50)
Equipment-specific training (interactive whiteboards, laptops, etc.)	74 (18.83)	319 (81.17)
Pedagogical use of ICT in teaching and learning	272 (69.04)	122 (30.96)
Subject-specific training on learning applications (tutorials, simulations, etc.)	134 (34.27)	257 (65.73)
Multimedia training (using digital video, audio equipment, etc.)	110 (28.13)	281 (71.87)
Participating in online communities (e.g. mailing lists, Twitter, blogs, WhatsApp) for professional discussions with other teachers	230 (58.23)	165 (41.77)
ICT training provided by school staff	171 (43.30)	224 (56.70)
Personal learning about ICT in teachers' own time	346 (87.60)	49 (12.40)
Other professional development opportunities related to ICT	252 (64.12)	141 (35.88)

Duration of training					
1–3 days	4–6 days	Less than 1 day	More than 6 days	No time at all	Total
132 (34.92%)	33 (8.73%)	38 (10.05%)	82 (21.69%)	93 (24%)	378 (100%)

2.2.2. Availability of an ICT co-ordinator

Eighty schools said they have an ICT co-ordinator, and of those,46 said the co-ordinators work full-time for a salary. This is true only for private and lay private schools. The main role of ICT co-ordinators is to provide support for the pedagogic use of ICT. They are generally more knowledgeable about the use of ICT in teaching and learning than the maintenance of ICTs or their application in other contexts.

2.2.3. Support from colleagues and/or experts

Table 2.8 indicates the kind of support teachers receive when they experience problems with integrating ICT in the teaching and learning process. The data indicate that those who receive support do so from several sources, including more experienced/knowledgeable teachers; the school's ICT/technology co-ordinator; other school staff; experts from outside the school; or an online helpdesk, community or website. However, the data also indicate that a majority of the teachers rarely or never receive any technical support, hence there is a need for a policy to define a support mechanism.

Table 2.8:*Kind of Support Teachers Receive and Frequency*

Support from colleagues and/or experts	**Rarely/never**	**Mostly technical support**	**Mostly pedagogic support**	**Both technical and pedagogic support**
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
A more experienced/knowledgeable teacher	120 (30.85)	24 (6.17)	133 (34.19)	112 (28.79)
School ICT/technology co-ordinator	173 (44.59)	26 (6.70)	105 (27.06)	84 (21.65)
Other school staff	168 (43.86)	25 (6.53)	114 (29.77)	76 (19.84)
Experts from outside the school	200 (51.95)	44 (11.43)	69 (17.92)	72 (18.70)
An online helpdesk, community or website	261 (67.80)	32 (8.31)	46 (11.95)	46 (11.95)

2.3. Learning with and through ICT

2.3.1. Pupil and teacher ICT-related activities

Table 2.9 shows ICT-related activities undertaken by teachers with their pupils. Teachers were asked to indicate how often they undertook certain ICT-related activities with their pupils. The top activity was using applications to prepare presentations for lessons (87.47%), followed by browsing or searching the Internet to collect information to prepare lessons (71.62%). Most teachers use ICT-related activities sparingly in teaching and learning activities. These results show there is a need to map out strategies through which ICT can become an integral part of the teaching and learning process.

Table 2.9: *Pupil and Teacher ICT-Related Activities*

Activities	Frequency (%)			
	Never	**Several times a week**	**At least once a week**	**Everyday**
Browse/search the Internet to collect information to prepare lessons	107 (28.38)	124 (32.89)	100 (26.53)	46 (12.20)
Browse/search the Internet to collect learning material or resources to be used by pupils during lessons	123 (32.80)	111 (29.60)	106 (28.27)	35 (9.33)
Use applications to prepare presentations for lessons	47 (12.53)	140 (37.33)	130 (34.67)	58 (15.47)
Create your own digital learning materials for pupils	283 (75.47)	30 (8.00)	46 (12.27)	16 (4.27)
Prepare exercises and tasks for pupils	199 (52.93)	84 (22.34)	71 (18.88)	22 (5.85)
Post home work for pupils on the school website	157 (41.87)	99 (26.4)	94 (25.07)	25 (6.67)
Use ICT to provide feedback and/or assess pupils' learning	171 (45.60)	103 (27.47)	59 (15.73)	42 (11.20)
Evaluate digital learning resources in the subject you teach	215 (57.49)	86 (22.99)	53 (14.17)	20 (5.35)
Communicate online with parents	115 (30.67)	155 (41.33)	72 (19.20)	33 (8.80)
Download/upload/browse material from the school's website or virtual learning environment/learning platform	107 (28.38)	124 (32.89)	100 (26.53)	46 (12.20)
Look for online professional development opportunities	123 (32.80)	111 (29.60)	106 (28.27)	35 (9.33)

2.3.2. Types of learning activities

Table 2.10summarises the findings on the type of activities teachers undertake in the teaching and learning process with or without the use of relevant ICTs. Research shows that these activities are key in enhancing teaching and learning outcomes, with or without the use of ICT, but using ICT in such activities strengthens the learning outcomes. From the table, it can be observed that very few teachers undertake the listed activities in their classrooms. It is imperative to include instruction in these activities in the teacher professional development strategy.

Table 2.10: *Types of Activities Teachers Undertake in the Instructional Process with or without the Use of Relevant ICTs*

Types of learning activities	Frequency (%)			
	A lot	**Sometimes**	**A little**	**None**
I present, demonstrate and explain to the whole class	373 (48.95)	312 (40.94)	50 (6.56)	27 (3.54)
I support and explain to individual pupils	267 (35.65)	377 (50.33)	61 (8.14)	44 (5.87)
Pupils work alone at their pace	90 (11.95)	372 (49.40)	134 (17.80)	157 (20.85)
Pupils work in groups	198 (26.26)	451 (59.81)	65 (8.62)	40 (5.31)
Pupils work on exercises or tasks individually at the same time	244 (32.50)	375 (49.93)	77 (10.25)	55 (7.32)
Pupils give presentations to the whole class	138 (18.33)	378 (50.20)	126 (16.73)	111 (14.74)
Pupils take tests and assessments	403 (53.81)	261 (34.85)	47 (6.28)	38 (5.07)
Pupils are engaged in enquiry-based activities	178 (23.83)	311 (41.63)	149 (19.95)	109 (14.59)
Pupils discuss ideas with other pupils and the teacher	240 (32.04)	310 (41.39)	116 (15.49)	83 (11.08)
Pupils reflect on their learning	279 (37.20)	275 (36.67)	151 (20.13)	45 (6.00)
Pupils participate in assessing their work	364 (48.28)	246 (32.63)	96 (12.73)	48 (6.37)

2.3.3. Types of materials teachers use when teaching with ICTs

Table 2.11 summarises the types of materials used by teachers when teaching with the aid of ICTs. Teachers reported most frequently using materials sourced via the Internet and existing online materials from established educational sources (34.03%). Very few teachers reported using materials available on the school's computer network or database (18.18%) or electronic offline

materials available on CD-ROMs (18.06%). The limited use of resources from the last two sources is attributable to the lack of a school computer network and offline electronic materials accessible through CD-ROMs.

Table 2.11: *Types of Materials Used by Teachers when Teaching with the Aid of ICTs*

Material	Frequency (%)	
	Yes	No
Material sourced via the Internet	277 (74.26)	96 (25.74)
Existing online material from established educational sources	242 (64.88)	131 (35.12)
Material that is available on the school's computer network or database	148 (39.89)	223 (60.11)
Electronic offline material (e.g. CD-ROMs)	147 (39.62)	224 (60.38)

2.4. Barriers to ICT Integration in the Teaching and Learning Process

2.4.1. Shortages and inadequacies

Table 2.12summarisesthe types of shortages and inadequacies teachers face when trying to integrate ICT into the teaching and learning process. The major challenges as reported by most respondents relate to inadequacies in terms of numbers of computers, Internet connectivity, bandwidth and skills, but they also touch on pressure to prepare students for exams and lack of content in national languages.

Table 2.12: *Shortages and Inadequacies in the Integration of ICT in Instructional Processes*

Shortage/inadequacy	Frequency (%)			
	A lot	Partially	A little	Not at all
Insufficient number of computers	195 (53.42)	34 (9.32)	38 (10.41)	98 (26.85)
Insufficient number of Internet-connected computers	199 (54.67)	27 (7.42)	22 (6.04)	116 (31.87)
Insufficient Internet bandwidth or speed	190 (52.63)	31 (8.59)	24 (6.65)	116 (32.13)
Insufficient number of interactive whiteboards	199 (54.97)	25 (6.91)	19 (5.25)	119 (32.87)
Insufficient number of laptops/notebooks	197 (54.42)	32 (8.84)	33 (9.12)	100 (27.62)
School computers out of date and/or need repairing	179 (49.72)	39 (10.83)	33 (9.17)	109 (30.28)
Lack of adequate skills among teachers	131 (36.29)	110 (30.47)	70 (19.39)	50 (13.85)
Insufficient technical support for teachers	175 (48.48)	75 (20.78)	59 (16.34)	52 (14.40)
Insufficient pedagogical support for teachers	132 (36.46)	113 (31.22)	64 (17.68)	53 (14.64)
Lack of adequate content/material for teaching	137 (38.06)	104 (28.89)	65 (18.06)	54 (15.00)
Lack of content in national language	172 (47.91)	68 (18.94)	62 (17.27)	57 (15.88)
Too difficult to integrate ICT use into the curriculum	61 (16.90)	102 (28.25)	101 (27.98)	97 (26.87)
Lack of pedagogic models on how to use ICT for learning	113 (31.39)	129 (35.83)	64 (17.78)	54 (15.00)
School time organisation (fixed lesson times, etc.)	82 (22.78)	126 (35.00)	86 (23.89)	66 (18.33)
School space organisation (classroom size and furniture, etc.)	112 (31.11)	97 (26.94)	76 (21.11)	75 (20.83)
Pressure to prepare pupils for exams and tests	129 (35.93)	90 (25.07)	83 (23.12)	57 (15.88)
Most parents not in favour of the use of ICT in school	100 (27.70)	59 (16.34)	54 (14.96)	148 (50.00)
Most teachers not in favour of the use of ICT in school	60 (16.71)	74 (20.61)	57 (15.88)	168 (46.80)
No or unclear benefit to using ICT for teaching	50 (14.01)	75 (21.01)	52 (14.57)	180 (50.42)

Using ICT in teaching and learning not a goal in our school	55 (15.45)	67 (18.82)	36 (10.11)	198 (55.62)

2.4.2. Teachers' skills

Table 2.13summarises teachers' skills in performing ICT-related activities. From the data, it can be observed that a majority of teachers lack the skills required to perform ICT-related activities. The skills required to perform these activities are fundamental, hence there is a need for a policy that emphasises empowering teachers to use ICT effectively in education.

Table 2.13: *Teachers' Skill Level in Performing ICT-Related Activities*

ICT-related skills	Frequency (%)			
	A lot	Sometimes	A little	None
Produce a text using a word processing programme	189 (25.40)	188 (25.27)	158 (21.24)	209 (28.09)
Use emails to communicate with others	245 (33.29)	207 (28.13)	103 (14.00)	181 (24.59)
Capture and edit digital photos, movies or other graphics	251 (34.15)	215 (29.25)	138 (18.78)	131 (17.82)
Edit text online containing Internet links and images	281 (38.39)	203 (27.73)	167 (22.81)	81 (11.07)
Create a database	356 (48.57)	157 (21.42)	135 (18.42)	85 (12.00)
Edit a questionnaire online	337 (45.85)	193 (26.26)	148 (20.14)	57 (7.76)
Email a file to someone, such as another pupil or teacher	280 (38.20)	213 (29.06)	112 (15.28)	128 (17.46)
Organise computer files in folders and sub-folders	324 (44.20)	151 (20.60)	145 (19.78)	113 (15.42)
Use a spreadsheet	325 (44.58)	163 (22.36)	145 (19.89)	96 (13.17)
Use a spreadsheet to plot a graph	368 (50.27)	140 (19.13)	144 (19.67)	80 (10.73)
Create a presentation with simple animation functions	365 50.07)	136 (18.66)	155 (21.26)	73 (10.01)
Create a presentation with video or audio clips	402 (54.77)	137 (18.66)	127 (17.30)	68 (9.26)
Participate in a discussion forum on the Internet	187 (27.22)	201 (29.26)	112 (16.30)	187 (27.22)
Create and maintain blogs or websites	445 (60.71)	94 (12.82)	130 (17.74)	64 (8.73)
Participate in social networks	153 (20.96)	223 (30.46)	128 (17.49)	228 (31.15)
Download or upload curriculum resources from/to websites or learning platforms for pupils to use	322 (43.99)	175 (23.91)	118 (16.12)	117 (15.98)
Teach pupils how to behave safely online	170 (23.19)	191 (26.06)	127 (17.33)	245 (33.42)
Teach pupils how to behave ethically online	162 (22.10)	180 (24.56)	124 (16.92)	267 (36.43)
Prepare materials to use with an interactive whiteboard	454 (62.28)	107 (14.68)	103 (14.13)	65 (8.92)
Download and install software on a computer	322 (44.29)	171 (23.52)	133 (18.29)	101 (13.89)

2.5. Open Educational Resources

2.5.1. Availability of textbooks

Table 2.14indicates the percentage of pupils with the required textbooks prescribed in the official booklist. Among the respondents, 378 (65.85%) indicated that less than 10% of pupils have all the required textbooks prescribed in the official booklist. Only 67respondents (11.67%) said that over50% of their pupils have all the required textbooks. This indicates a need for an OER policy to facilitate the production and distribution of resources in the basic education sub-sector.

Table 2.14: *Percentage of Pupils with the Required Textbooks in the Official Booklist*

Items	Frequency (%)
< 10% pupils have all the required textbooks	378 (65.85)
10–20% of pupils have all the required textbooks	80 (13.93)
20–30% of pupils have all the required textbooks	49 (8.54)
40–50% of pupils have all the required textbooks	0
>50% of pupils have all the required textbooks	67 (11.67)

2.5.2. Open educational resources

Regarding respondents' knowledge of the existence of open educational resources (OER), 367(56.63%) said they had heard about these resources and281 (43.36%) reported that they knew nothing about them. Among those who had heard about the resources, 161(43.86%) said they read about them on the Internet,62 (16.89%) said they heard about them in a workshop,70(19.07%) said a colleague told them about OER and 74(20.16%) said they read about them in textbooks. However, at the time of the survey, only 170(27.03%) had used OER in lesson preparation. Among the OER users, only 79 (41.57%) said they were familiar with the different Creative Commons licences. These data seem to indicate that very few teachers and headteachers know about OER. Owing to the importance of OER in cutting down the cost of textbooks and serving as free resources to supplement curriculum resources, there is a need for it to become an integral part of the Ministry's policy and strategic framework.

2.6. Open, Distance and e-Learning

Open, distance and e-Learning (ODeL) is increasingly becoming an integral part of educational systems around the world because of its potential to widen access to learning anytime, anywhere. Regarding respondents' knowledge of its existence, 608(94.11%) said they had heard about it.

2.6.1. Preferred ODeL mode

Table 2.15shows respondents' preferences for delivery modes of open distance and e-Learning. The data indicate that 221respondents (24.21%) prefer an online learning mode, 195 (21.36%) prefer TV instruction and a similar number indicated they are happy with all delivery modes. Given the disparities in socio-economic development among rural, semi-urban and urban communities, it is advisable to explore the use of a range of instructional delivery modes to provide in-service teacher training.

Table 2.15: *Respondents' Preferred ODeL Mode*

Item	Frequency (%)
Radio instruction	91 (9.96)
TV instruction	195 (21.36)
Online learning	221 (24.21)
Mobile learning	101 (11.06)
Print-based learning	110 (12.05)
All of the above	195 (21.36)
Total	913 (100)

2.7. ICT-Related Partnership Projects

Table 2.16indicates the number of ICT partnership projects in the basic education sub-sector. Fifty-one schools participated in the Pilot Project for the Amelioration of the Quality of Basic Education (PAQUEB). This project, funded by the Islamic Development Bank, aimed to explore the integration of ICT in the teaching and learning process. The pilot phase ended in 2016, though some of the schools that participated are still using the XO laptops distributed during the project. Unfortunately, the pilot project was never extended to other schools. Respondents also indicated that 36 schools are participating in the Orange Foundation ICT project. This project, funded by Orange Mobile Phone Company as part of their corporate social responsibility mandate, started in 2016 with the aim of providing teachers and pupils with a digital library in order to enhance teaching and learning. The project provides schools with tablet devices connected to the Internet and a school server loaded with OER. The project is ongoing although progress has been slow to date. Respondents also indicated that UNICEF Cameroon is funding 17 ICT projects in schools via theConnect My School project. Connect My School started in 2017.While it lost momentum in its early stages, the project was revitalised in 2020 with the introduction of e-Hub, which brought participating schools a tablet computer, computer room, library where pupils could share ideas. The facility is connected to high-speed Internet and a solar energy source of electricity. Respondents also reported the existence of 62 ICT projects funded by local councils, although little is known about these projects, and 27 ICT projects funded by the mobile telephone service provider MTN Cameroon. The aim of MTN's project is to facilitate the introduction of ICT to the teaching and learning process. The respondents reported that the projects are beneficial to their schools because teaching and learning outcomes have improved since their inception. Furthermore, many parents were motivated to enrol their children in schools that use ICT. It was also reported that school attendance rates have been boosted by the presence of ICT tools in schools, especially on days when pupils know they will be learning with them.

Table 2.16: *ICT Partnership Projects*

Project title	Number of schools involved
PAQUEB XO Laptop project	51
Orange Foundation ICT project	36
UNICEF Connect My School project	17
Local Council ICT project	62
MTN ICT project	27

2.8. Lessons Learned

From the survey data analysis, some key themes emerged.

2.8.1 School ICT infrastructure and connectivity development

Data from the surveyed schools reveal that a majority of schools lack the minimum equipment and infrastructure to effectively integrate ICT in the teaching and learning process. Most schools do not have even one computer, and those that do have some do not have them regularly maintained because of a lack of qualified maintenance staff. Similarly, a majority of schools do not have access to the Internet, and those that are connected regularly suffer from low bandwidth issues. These

challenges — and many more — require a firm political commitment to change, because reliable ICT infrastructure and connectivity are paramount for the success of ICT in education.

2.8.2 ICT in teaching, learning and assessment

The use of ICT in teaching, learning and assessment remains low as reported in the survey. Most teachers lack the basic skills to mainstream ICT across the curriculum. Although most schools are not equipped with the relevant ICTs, some teachers have personal devices that they could use to enhance their productivity but they lack the skills to do so. In addition, they lack support and perceive their lack of skills and support as barriers to integrating ICT in education. To ensure that pupils receive quality teaching a strong political decision to implement an ongoing professional development programme is required.

2.8.3 ICT in school management and administration of initiatives

With the advent of ICT in education, and the resulting opportunities for automation, school administration processes can become significantly more effective and efficient. This is not yet the case, however, hence the need for a clear commitment to implement ICT in school management and administration.

2.8.4 OER development and distribution

Globally, one of the many factors that contribute to enhancing learning outcomes is the availability of learning resources. Although pupils' textbook possession rates are gradually improving in Cameroon, the use of OER is still very low. Most of the survey respondents have heard about OER but are yet to explore their use in an education context. A strong political commitment to the universal production and distribution of OER is also necessary. Teachers and pupils, especially those from disadvantaged backgrounds, will benefit more from the availability of such resources.

2.8.5 Partnerships

Partnerships have proven to be a key component in the integration of ICT in the teaching and learning process. Because of the huge financial implications, government cannot bear sole responsibility for ICT, hence the need for partnerships. The survey data indicate that very few partners are currently involved in the process. With the increasing scarcity of financial resources, it is imperative that measures be taken to bring more partners on board to support the process.

2.8.6 ODeL development

The use of ODeL as a mode of instruction is still in the embryonic stage in the basic education sub-sector. A majority of the respondents said they have heard about distance education but have never practised it. Teaching and learning trends in recent times are showing a distinct favouring of distance learning as an alternative and sustainable mode of curriculum delivery that can be relied upon even in times of crisis. Most respondents believe instructional materials should be developed in multi-delivery formats to widen their potential accessibility. It is imperative that measures be taken to ensure that the use of ODeL becomes an integral part of the educational system.

3. ICT IN EDUCATION: STRATEGIC FRAMEWORK

This ICT in Education Policy and Strategic Framework is based on nine key components that underpin the use of ICTs in education: infrastructure and connectivity development; human resources and capacity building in ICT; ICT in teaching, learning and assessment; ICT in school management and administration of initiatives; open educational resources development and distribution; sustainability, maintenance and support; support for local council initiatives and partnerships; open, distance and e-Learning development; and monitoring and evaluation. This section begins with a discussion of the framework's broader vision and goals in terms of integrating ICT in the basic education sub-sector and moves on to the provision of goals, strategic objectives and expected results of each of the nine pillars underpinning the successful implementation of ICT.

3.0. Vision

The vision of the strategic framework is to ensure the extensive use of ICT in the basic education sub-sector and contribute to access and quality of education for all.

3.1. Mission

The mission of the strategic framework is to narrow the digital divide through the development of ICT infrastructure, human resources, digital contents and system enhancement in education.

3.2. Goals

The main goals of using ICT outlined in the Basic Education Sub-Sector Strategic Framework are:

1. To expand equitable access to education.
2. To enhance the quality of education.
3. To reduce the digital divide.
4. To improve the service delivery system in education.

3.3. Strategic Priorities

3.3.1. Gender equality

The equitable use of ICTs in the basic education sub-sector requires strategic decisions about gender equity, inclusiveness and resource allocation. It is expected that the principle of equity will inform the approaches taken and provide the basis for all decisions relating to the allocation of resources to avoid the likelihood of technology amplifying existing in-country digital divides.

3.3.2. Access for pupils with disabilities

ICT can increase access to education through various channels that can help reach pupils outside the traditional classroom and pupils with a disability and special needs. Many channels, including radio, television and the Internet, can provide distance education opportunities to a large number of pupils. Isolated communities, early school leavers and pupils with special needs can all shift their learning experience from being a one-time event to being a lifelong learning process via the formation of new communities of learning. Digital learning resources have also proven to improve

pupils' motivation, retention and quality of learning. Resources will be developed using principles of universal design for learning to improve accessibility and specialised software will be made available to pupils with special needs. The success of this will depend on the availability of the appropriate physical infrastructure which includes classrooms and power sources such as electricity and solar energy.

3.3.3. Pupils' success

Various types of learning technologies have proven to enhance the quality of learning outcomes and contribute to pupils' overall success. However, ICT has also proven to be a source of distraction and abuse as well as a health hazard if not used appropriately. Adequate measures will be taken to safeguard pupils' responsible use of the different technological tools made available in schools.

3.4. Strategic Pillars

With the overarching objective of disseminating ICT in the basic education sub-sector to enhance the quality of education for all and equip pupils with 21st-century skills, nine strategic pillars will be given special attention during 2021–26.

3.4.1. ICT infrastructure and connectivity development

Expanding and maintaining ICT infrastructure is an imperative objective for the basic education sub-sector in the context of fostering ICT integration. Equipping schools with affordable power sources, ICT equipment and connectivity represents a vital first step towards more equitable access to education, computer literacy and other essential skills for a knowledge-society workforce. Equipping classrooms with the relevant learning technologies and Internet connectivity is paramount for the successful integration of ICT into the teaching and learning process. ICT facilities in rural areas will be treated as a priority to enable these communities to take advantage of distance education opportunities. The guidelines on how ICT equipment can be deployed in schools to maximise access to ICT facilities are covered below.

Goal: Provide adequate ICT infrastructure and high-speed Internet connectivity to schools within the basic education sub-sector.

Strategic objectives:

- Establish/update the necessary infrastructure to facilitate the installation of ICT within the basic education sector.
- Deploy the relevant infrastructure to embrace technology.
- Ensure the suitability/readiness of the school environment/climate for the incorporation of ICT.

Expected outcome: Schools have relevant infrastructure and connectivity to leverage the use of ICTs in teaching and learning.

3.4.2. Human resources and capacity building in ICT

Capacity training programmes for the use of ICT in teaching and learning will be developed and provided to teachers, pupils and school administrators. The programmes will accompany the

infrastructural rollout to ensure that teachers and administrators are familiar with using the ICT equipment provided. Capacity development frameworks will be developed, and specific ICT standards and competencies defined and made available to ensure all capacity building courses are tailored to meet local standards and requirements. Basic ICT literacy and ICT and pedagogic development will also be emphasised in the curricula of Grade 1teacher training programmes.
ICT skills development at a management and administration level in MINEDUB will also be addressed through the creation of capacity development frameworks for training staff in the Inspectorate General of Education.

Goal: Ensure all stakeholders in the teaching and learning chain have the requisite skills to explore various technologies in a school's administration, teaching and learning, assessment, and monitoring and evaluation.

Strategic objectives:

- Provide appropriate training to teachers before they attempt to introduce ICTs into the classroom.
- Provide training for head teachers of schools in the management of technology and in ICT as a managerial tool.
- Facilitate the monitoring and evaluation of ICT projects by members of the pedagogic supervision chain.

Expected outcomes:

- Pedagogic supervisors have the ability to empower classroom teachers to improve teaching and learning.
- Head teachers have the relevant competences to adequately manage their schools with the relevant ICT.
- ICT projects are adequately managed.

3.4.3. ICT in teaching, learning and assessment

ICT-enabled teaching and learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching-learning process. Teachers have a variety of options — ranging from using overhead projectors and multimedia self-learning modules to creating simulations and virtual learning environments —for using ICT tools effectively. Each device or strategy also brings changes in the classroom environment and its bearing on effectiveness. The availability of a wide range of such teaching-learning materials will catalyse the transformation of classrooms into ICT-enabled classrooms. The curriculum should be revised regularly to keep it up to date since the field is changing rapidly.

Goal: Ensure that teachers are exploring various ICTs to enhance teaching-learning processes as they empower pupils with foundational ICT and creative thinking skills.

Strategic objectives:

- Integrate ICT into the curriculum.
- Ensure the availability of inclusive digital learning resources.

- Develop and mainstream digital assessment in the school curriculum.
- Disseminate best practices in teaching and learning with ICTs.

Expected outcomes:

- Enhanced learning outcomes for all pupils.
- Teachers embrace innovative instructional methods.

3.4.4. ICT in school management and administration of initiatives

School management and administration processes can be automated to simplify and facilitate processes, procedures and services. The implementation and deployment of school-based management information systems (MIS) will constitute part of the automation. These MIS will be integrated into the Ministry's website to facilitate the collection of school-based data.

Goal: Ensure that school management, administrative procedures and services are enhanced with the aid of various ICTs.

Strategic objectives:

- Implement an educational management system that recognises the relevance of ICTs in education.
- Develop institutional capacity in the use of computer-based management tools to enhance administration and management objectives.

Expected outcomes:

- School administration processes are simplified, automated or both.
- Enhanced accountability in the management of school resources (financial and material).
- School data are available when required.

3.4.5. OER development and distribution

Most teachers and pupils are not fully aware of how OER can enhance teaching and learning outcomes. Currently, relatively few teachers and pupils are using OER despite the low purchasing power of most parents and the high cost of textbooks. There have been a few initiatives to introduce OER into classrooms, but a policy framework and strategy that could guarantee their successful development, adaptation, sharing and use in the basic education sub-sector has been lacking. In recognition of the potential of OER to provide access to learning materials and improve the quality of teaching and learning, the use of OER will be promoted through the adoption of an open licensing framework. This document will help raise awareness among teachers, pupils and the greater community of the availability and cost-free nature of open-licensed educational materials.

Goal: Widen access to teaching and learning resources in all media free of charge.

Strategic objectives:

- Carry out a massive awareness campaign on the availability and importance of OER.
- Enhance the competencies of head teachers, teachers and pupils in the use of OER.
- Set up an OER repository to widen access to OER.

- Create partnerships that foster the creation and sharing of OER.
- Monitor and evaluate the use of OER in the basic education sub-sector.

Expected outcomes:

- Increased access to teaching and learning materials for primary education.
- All stakeholders are aware of the existence of OER and how they can reduce the cost of educational materials for pupils and teachers.
- A qualified team of teachers and pupils with capabilities to effectively create, adopt, adapt, distribute and use OER under open licences to enhance quality and equity in education.
- A commitment from MINEDUB to provide OER repositories and human, financial and other relevant resources necessary for the implementation of OER at national and regional levels, as well as quality assurance mechanisms.

3.4.6. Sustainability, maintenance and support

Currently, there is no adequate mechanism in place to sustain, maintain and provide support to schools with access to computers. Most schools use less than 10% of the available equipment. The data indicate that some head teachers still store computers in their offices, thus preventing pupils and teachers from using them. Furthermore, of those schools with access to ICTs, most are unable to use them across the curriculum. Therefore, there is a need to ensure optimal use of ICT resources by pupils, teachers and administrators in order to exploit the technology's educational potential.

Goal: Ensure the sustainability and maintenance of all ICT equipment and provide timely support for those who need it.

Strategic objectives:

- Facilitate schools to take ownership of and responsibility for their ICT resources.
- Facilitate funding mechanisms for ICT implementation through private-public partnerships.
- Foster constructive partnerships with private sector and civil society organisations for ICT deployment.
- Adopt a systematic approach to the procurement and management of ICT hardware and software.
- Ensure an effective maintenance and technical support mechanism.
- Encourage the local generation of revenue to maintain ICT equipment.
- Ensure appropriate disposal of e-waste.

Expected outcomes:

- Improved use of ICT infrastructure at the school level.
- School equipment is regularly maintained.
- E-waste is properly recycled.

3.4.7. Support for local council initiatives and partnerships

ICT integration in the basic education sub-sector is capital-intensive, so it requires the participation

of partners to assist the government in creating a tangible impact. Current ICT initiatives have helped an estimated 2% of the sector, with most initiatives being concentrated in urban areas.

Public-Private Partnerships (PPPs) will help in rolling out a comprehensive ICT strategy with substantial impact. The overall objective for ICT development in education is to foster a favourable environment and provide leadership for public/private/development partner collaboration. This would lead to effective sector-wide ICT initiatives and co-ordination.

PPPs will facilitate the mobilising of resources, including human, technological and financial resources, for the implementation of ICT in education projects and programmes. Furthermore, links will be established with global initiatives in an effort to align national ICT in education initiatives with regional and global practices to achieve relevance.

Goal: Mobilise partners to support local councils and the government in the development of ICT in education.

Strategic objectives:

- Recognise and support the role of MINEDUB and its partners in facilitating ICT initiatives in education.
- Develop modalities for reducing costs of ICT products and services.
- Encourage cost-sharing for establishing schools' ICT infrastructure with parents and communities.

Expected outcomes:

- Enhanced partnerships between the public and private sectors for ICT in education through shared ownership of ICT initiatives.
- Better co-ordination of ICT initiatives in the basic education sub-sector, leading to efficiency in service provision.
- Local councils are involved and actively participate in supporting the effective integration of ICT in instructional processes.

3.4.8. Open and distance learning development

Open and distance learning (ODL) is a form of instructional delivery that does not require teachers and pupils to be in the same place at the same time for learning to happen. Because pupils and teachers are separated by time and space, they communicate via various technologies. Pupils receive self-learning materials in various formats: print, audio, video and computer. ODL embraces a range of possibilities from offline (print only) to fully online provision, and a blend of both. ODL will be used to enhance the provision of accessible, quality assured, flexible, relevant and sustainable ODL opportunities for teachers and learners.

Goal: Explore open, distance and e-Learning modes for the delivery of teaching and learning for all categories of pupils.

Strategic objectives:

- Expand open, distance and e-Learning for both basic education and in-service teacher training.
- Empower members of the pedagogic supervision chain with skills in open, distance and e-Learning.
- Deploy appropriate content for open, distance and e-Learning.
- Source and provide funds for the expansion of open, distance and e-Learning.
- Institute learner support systems.

Expected outcomes:

- A functional open, distance and e-Learning platform for pupils to access learning anytime, anywhere.
- Digital learning content for each subject area is available as OER and accessible via the platform.
- E-library/online repositories are available.
- The distance learning support system is both adequate and functional.

3.4.9. Monitoring and evaluation

The implementation of the ICT strategy is an enormous task and requires systematic monitoring and evaluation (M&E) of all activities. M&E will provide an opportunity to learn from the entire implementation process, improve the rollout framework, allocate supplementary resources and demonstrate results as part of an institution's accountability to key stakeholders and partners.

Goal: Ensure that activities are implemented as planned and respect the agreed norms and standards.

Strategic objectives:

- Institute programmes and procedures to monitor and evaluate the implementation of the various components of the ICT education policy.
- Develop instruments to monitor all interventions proposed in the strategy.

Expected outcomes:

- Quarterly and annual performance reports on ICT interventions that indicate if the performance indicators are being achieved.
- Recommendations for improvements are available.

4. ICT IN EDUCATION MASTER PLAN

No	Activities	Indicators	Stakeholder	Timeframe
1. ICT Infrastructure and connectivity development **Goal:** Provide adequate ICT infrastructure and high-speed Internet connectivity to schools within the basic education sub-sector				
Strategic objective 1.1: Establish/update the necessary infrastructure to facilitate the installation of ICT within the basic education sub-sector				
1.1.1	Undertake assessment of the physical environment in all schools in order to determine physical and technical infrastructure requirements	Report on the number of schools assessed for ICT deployment	MINPOSTEL IP-ET, DPPC, DRFM, CEL-Info	Dec 2022
1.1.2	Develop a phased framework for schools to embrace a technology-enriched learning environment	Phased framework for schools to embrace technology-enriched learning environment	IP-ET, DPPC, DRFM, CEL-Info	Dec 2022
1.1.3	Conduct regular assessment of existing networks within schools and propose how they can be interlinked or upgraded	Assessment report on existing networks and upgrade recommendations available	MINPOSTEL, IP-ET, DPPC, DRFM, CEL-Info	Ongoing until 2026
1.1.4	Prepare a detailed design of a cost-effective, equitably distributed and secured national network for ICT in the basic education sub-sector	Framework for a secure national network	IP-ET, DPPC, DRFM, CEL-Info, Consultant	Dec 2022
Strategic objective 1.2: Deploy the relevant infrastructure to embrace technology				
1.2.1	Liaise with local councils to provide an electricity supply to the schools where the ICT deployment is prioritised	Number of schools with electricity supply	IP-ET, DPPC, DRFM, CEL-Info	Dec 2022
1.2.2	Deploy ICT infrastructure	Number of schools with ICT infrastructure	MINPOSTEL, IP-ET, DPPC, DRFM, CEL-Info	Ongoing until 2026
1.2.3	Acquire and configure Ministry servers to provide Internet access for all schools	Number of schools connected to the Ministry server	IP-ET, DPPC, DRFM, CEL-Info	Dec 2023
Strategic objective 1.3: Ensure the suitability/readiness of school environment/climate for the incorporation of lCTs in teaching and learning				
1.3.1	Undertake a comprehensive assessment of schools' readiness to embrace teaching/learning with ICTs	Assessment report on schools to embrace the practical teaching/learning with ICTs	IP-ET, DPPC, DRFM, CEL-Info	Dec 2023
1.3.2	Undertake a formal assessment of current teacher and head teacher ICT competencies	Assessment report on teachers'/head teachers' ICT competences	IP-ET, DRFM	Dec 2022
1.3.3	Conduct awareness programmes on the acceptable use of ICT in schools	Number of awareness programmes conducted	NAICT, IP-ET, DRFM	Ongoing until2026
1.3.4	Produce guidelines for the acceptable use of ICT	Number of schools with guidelines on the acceptable use of ICT	NAICT, IP-ET, DRFM	Ongoing until2026
1.3.5	Disseminate information on ergonomics and cumulative trauma disorders among all computer users in the basic education sector	Number of schools with guidelines on ergonomics and cumulative trauma disorders	IP-ET, DRFM	Ongoing until2026
1.3.6	Establish cost-effective connectivity contract with Internet service provider to accompany MINEDUB in digitalising the educational system	Number of ISPs approved and contracted	NAICT, CAMTEL, ISP, IP-ET, DRFM	Ongoing until2026

No	Activities	Indicators	Stakeholder	Timeframe
2. Human resources and capacity building in ICT **Goal:** Ensure all stakeholders in the teaching and learning chain have the requisite skills to explore various technologies in a school's administration, teaching and learning, assessment, monitoring and evaluation				
Strategic objective 2.1: Provide appropriate training to teachers before they attempt to introduce ICTs into the classroom				
2.1.1	Review the current pre-service teacher training programme on the ICT curriculum in collaboration with the Ministry of Secondary Education	Reviewed ICT programme for pre-service teachers validated	MINESEC/IGE, MINEDUB/IGE, DRFM, from both Ministries	Dec 2022
2.1.2	Identify and adapt ICT competencies to local contents	ICT competency framework for teachers available	IGE, DRFM	Dec 2022
2.1.3	Develop training manuals and train teachers, pupils and head teachers to integrate ICT in instructional processes	Training manual for each target group available	IGE, DRFM	Dec 2023
2.1.4	Make training materials available to teachers and educators through existing distribution channels	Number of educators accessing training materials	IGE, DRFM	Dec 2023
2.1.5	Develop a procurement process for relevant ICTs and train teachers to use them	ICT procurement framework available	IP-ET, DPPC, DRFM, CEL-Info	Ongoing until2026
2.1.6	Identify and/or develop distance education and/or part-time programmes for in-service teachers	Number of modules for in-service teacher training through distance learning available	IGE, DRFM, DRH	Dec 2023
2.1.7	Encourage and support enrolment in ICT teacher education programmes	Amount of money available annually for enrolment in ICT teacher education programmes	IGE, DRFM, DRH	Ongoing until2026
Strategic objective 2.2: Provide training for head teachers of schools in the management of technology and in ICT as a managerial tool				
2.2.1	Assess the competencies of head teachers and officials charged with school administration in ICT management and the use of ICTs for management	Competencies assessment report available	IGE, DRFM	Dec 2023
2.2.2	Source and provide training opportunities on management and the use of ICTs in school administration for officials involved with school administration	Funds allocated for ongoing training in management and use of ICTs in school administration	IGE, DRFM	Ongoing until2026
2.2.3	Encourage educators to access the available training opportunities	Lists of educators soliciting training	IGE, DRH, DRFM	Ongoing until2026
Strategic objective 2.3: Facilitate the monitoring and evaluation of ICT projects by members of the pedagogic supervision chain				
2.3.1	Empower supervisors to develop training manuals for teachers, pupils and head teachers to integrate ICT practices	Report on the training of supervisors	IGE, DRFM	Ongoing until2026
3. ICT in teaching, learning and assessment **Goal:** Ensure that teachers are exploring various ICTs to enhance teaching-learning processes as they empower pupils with foundational ICT and creative thinking skills				
Strategic objective 3.1: Integrate ICT into the curriculum				
3.1.1	Create guidelines on the integration of ICT in various subject areas	Guidelines on the integration of ICT available	IGE, DRFM	Dec 2024

No	Activities	Indicators	Stakeholder	Timeframe
3.1.2	Create and develop Cameroon-specific national electronic content in all subjects, to be used in the long term as supplementary material; align it with the national curriculum and revise the curriculum accordingly	Cameroon-specific digital content available	IGE, DRFM	Ongoing until2026
3.1.3	Encourage the sharing of experiences (lessons learned and best practices) in relevant meetings and forums	Number of lessons from best practices available	IGE	Ongoing until2026
3.1.4	Produce curriculum-related materials for delivery through various media such radio, TV, web-based, mobile and print	Number of lessons available in different media	IGE, DRFM, Partners	Ongoing until2026
3.1.5	Set up a national OER repository	URL for the repository available	IGE, DRFM, Partners	Ongoing until2026
Strategic objective 3.2: Ensure the availability of inclusive digital learning resources				
3.2.1	Develop instructional methods that use ICTs to meet the needs, interests and learning styles of individual pupils, particularly those with special needs	Number of lessons that address special needs of pupils available	IGE, DRFM, Partners	Ongoing until2026
3.2.2	Establish special programmes for pupils who have learning disabilities or are gifted or talented	Number of programmes for special needs and gifted pupils available	IGE, DRFM, Partners	Ongoing until2026
3.2.3	Explore the use of adaptive technologies for pupils with special needs (e.g. those with visual, hearing or physical impairments)	Number of adaptive technologies for special needs and gifted pupils available	IGE, DRFM, Partners	Ongoing until2026
Strategic objective 3.3: Develop and mainstream digital assessment in the school curriculum				
3.3.1	Sensitise stakeholders (parents, teachers and pupils) on the benefits of digital assessment methods	Report on sensitisation programmes conducted	IGE, DRFM, Partners	Ongoing until2026
3.3.2	Develop/adapt digital assessment tools adaptable to various assessment methods	Number of digital assessment tools developed	IGE, DRFM, Partners	Ongoing until2026
3.3.3	Determine and implement authentic assessment (rubrics, project-based, portfolios and case studies) for students	Number of schools implementing authentic assessments	IGE, DRFM, Partners	Ongoing until2026
3.3.4	Progressively integrate digital assessment across the school curriculum	Number of schools implementing digital assessment methods	IGE, DRFM, Partners	Ongoing until2026
3.3.5	Conduct annual evaluations of ICT and ICT integration programmes	Evaluation report available annually	IGE, DRFM, Partners	Ongoing until2026
Strategic objective 3.4: Disseminate best practices in teaching and learning with ICTs				
3.4.1	Create digital learning communities of practice	Numbers of users subscribed to the functional online community	IGE	Ongoing until2026
3.4.2	Create a centralised digital library/repository (Cameroon Educational Portal) of digital learning material to be accessed by all schools	Number of resources available in a functional online library	IGE, DRFM, Partners	Ongoing until2026
3.4.3	Encourage the sharing of experiences (lessons learned and best practices) in relevant meetings and forums	Number of lessons and best practices shared	IGE	Ongoing until 2026
3.4.4	Host competitions and technology fairs/conventions to showcase the work and accomplishments of teachers and pupils	Report on annual technology fairs/conventions	IGE	Ongoing until2026

No	Activities	Indicators	Stakeholder	Timeframe
4. ICT in school management and administration of initiatives **Goal:** Ensure that school management, administrative procedures and services are enhanced with the aid of various ICTs				
Strategic objective 4.1: Implement an educational management system that recognises the relevance of ICTs in education				
4.1.1	Assess the competencies of educators and head teachers in the use of relevant ICT for administration	Report on educators' and headteachers' competencies	IGE, DRFM, DRH	Ongoing until2026
4.1.2	Re-orient education leadership on the new paradigm and on change management	Number of workshops organised to re-orient leadership	IGE, DRFM	Ongoing until2026
4.2.3	Develop and enforce workplace regulations and norms for using ICT tools for management and administrative functions; support institutional-level technology planning	Guidelines on workplace regulations and ICT norms	IGE, DRFM, Partners	Dec 2022
4.4.4	Develop appropriate regulations for ICT deployment	Guidelines for the deployment of ICT	IGE, DRFM, DPPC	Dec 2022
Strategic objective 4.2: Develop institutional capacity in the use of computer-based management tools to enhance administration and management objectives				
4.2.1	Evaluate various types of management information systems (MIS) and applications that can be used in education administration	Report on the evaluation of MIS	IGE, DRFM, DPPC	Ongoing until2026
4.2.2	Acquire, develop and implement suitable (preferably indigenous) information systems software for use in the Ministry, its agencies and schools	Number of services and agencies, information systems software	IGE, DRFM, DPPC	Ongoing until2026
4.2.3	Provide appropriate training to teachers, head teachers and officers at all levels of the basic education sub-sector in setting up and using the education management information system (EMIS) solution	Number of teachers, head teachers and officers trained	IGE, DRFM, DPPC	Ongoing until2026
4.2.4	Develop the capacity of staff in the Ministry and other sector implementation agencies to use information management tools and to ensure the implementation and support of ICT programmes in schools	Number of sectors and services using information management tools	IGE, DRFM, DPPC	Dec 2022
4.2.5	Develop schools' personnel capacity to use information management tools and to enhance efficient and cost-effective administration	Number of schools using information management tools	IGE, DRFM	Dec 2022
5. OER development and distribution **Goal:** Widen access to teaching and learning resources in all media free of charge				
Strategic objective 5.1: Carry out a massive awareness campaign on the availability and importance of open educational resources (OER)				
51.1	Sensitise the general public on the existence of OER and its potential to reduce the cost of educational materials and reduce the pupils-textbooks possession ratio	Number of sensitisation sessions held	IGE, DRFM	Ongoing until2026
Strategic objective 5.2: Enhance the competencies of teachers, head teachers and pupils in the use of OER				
5.2.1	Develop teachers' and pupils' knowledge, skills and attitudes in the effective creation, adaptation, distribution and use of OER under open licences with a view to enhancing quality and equity in education at the school level	Number of teachers and pupils trained to use OERs	IGE, DRFM	Ongoing until2026

No	Activities	Indicators	Stakeholder	Timeframe
5.2.2	Develop mechanisms that encourage, promote and ease the creation, adoption, adaptation, distribution and use of educational materials under open licences in all schools under MINEDUB	Detailed framework for the promotion of OER creation	IGE, DRFM	Ongoing until2026
5.2.3	Develop guidelines that encourage teachers and pupils to create, adopt, adapt, distribute and use educational materials that adhere to the legal framework of Creative Commons open licensing[37]	Guideline document for the creation, adoption and distribution of OER	IGE, DRFM	Dec 2022
Strategic objective 5.3: Set up an OER repository to widen access to OER				
5.3.1	Develop OER repositories and quality assurance mechanisms that enforce open licensing of educational material polices at national and regional levels	OER repository operational	IGE, DRFM	Dec 2023
5.3.2	Map out strategies that foster the distribution of OER through print, the Internet and emerging technologies to facilitate access for all users	Strategic framework that fosters OER distribution in various formats available	IGE, DRFM	Dec 2023
5.3.4	Develop strategies that prioritise the distribution of OER in disadvantaged and marginalised communities, facilitate inclusive education for pupils with varying abilities and transform instructional processes with innovative pedagogic practices	Strategic framework for the distribution of OER in marginalised communities	IGE, DRFM	Dec 2023
Strategic objective 5.4: Create partnerships that foster the creation and sharing of OER				
5.4.1	Identify strategies that foster partnerships with governmental and non-governmental organisations and institutions of learning interested in supporting the creation, adoption, adaptation, distribution and use of educational materials under open licences	Partnership mobilisation strategies available	IGE, DRFM	Dec 2023
Strategic objective 5.5: Monitor and evaluate the use of OER in the basic education sub-sector				
5.5.1	Produce monitoring and evaluation tools for OER mainstreaming	Monitoring instruments available	IGE, DRFM	Dec 2023
5.5.2	Monitor the use of open licensing for educational materials including research resources produced with public bodies; restrictions, if any, will be on a case-by-case basis	Monitoring report available	IGE, DRFM	Ongoing until2026
6. Sustainability, maintenance and support **Goal:** Ensure the sustainability and maintenance of all ICT equipment and provide timely support for those who need it				
Strategic objective 6.1: Facilitate schools to take ownership of and responsibility for their ICT resources				
6.1.1	Encourage the formation of school ICT leadership and implementation teams	Number of school ICT leadership and implementation teams created annually	IGE, DRFM, DPPC, local council	Ongoing until2026
6.1.2	Provide training to schools in the development of ICT implementation frameworks and leadership	Number of schools trained in the development of ICT implementation frameworks and leadership	IGE, DRFM, DPPC, local council	Ongoing until2026
6.1.3	Monitor the progress of the implementation of the ICT implementation framework in each school	Monitoring report available	IGE, DRFM, DPPC, local council	Ongoing until2026

[37] https://creativecommons.org/

No	Activities	Indicators	Stakeholder	Timeframe
Strategic objective 6.2: Facilitate funding mechanisms for ICT implementation through public-private partnerships				
6.2.1	Establish partnership programmes with local and international partners for funding at school or national levels	Number of partnerships established	IGE, DRFM, DPPC, local council	Ongoing until2026
6.2.2	Encourage fundraising activities at school and national levels	Amount of money raised at school and national levels	IGE, DRFM, local council	Ongoing until2026
Strategic objective 6.3: Foster constructive partnerships with private sector and civil society organisations for ICT deployment				
6.3.1	Establish private sector/civil society partnership programmes for sharing hardware, software, materials and training for ICT activities	Number of partnerships created with private sector/civil society organisations	IGE, DRFM, DPPC, local council	Ongoing until2026
6.3.2	Provide special concessions to businesses that fund ICT projects in schools	Text outlining concession to business firms	MINEFI, IGE, DRFM, DPPC	Ongoing until2026
6.3.3	Host public relations programmes to highlight the benefits of ICT in education and the various ways in which the community, business, professional associations and individuals can help	Number of public relations programmes hosted	IGE, DRFM, DPPC	Ongoing until2026
6.3.4	Draw on international volunteer programmes for ICT-related technical and training expertise	Number of international overseas volunteer programmes running	IGE, DRFM, DPPC	Ongoing until2026
Strategic objective 6.4: Adopt a systematic approach to the procurement and management of ICT hardware and software				
6.4.1	Develop clear guidelines for the procurement/acquisition of equipment	Procurement/acquisition guidelines available	IGE, DRFM, DPPC	Ongoing until2026
6.4.2	Develop and maintain a regularly updated database of vendors/suppliers of ICT-related merchandise.	Vendors/supplier database	IGE, DRFM, DPPC	Ongoing until2026
6.4.3	Develop and implement a strategy for the standardisation of ICT equipment in schools	Strategy for the standardisation of ICT equipment available	IGE, DRFM, DPPC	Ongoing until2026
Strategic objective 6.5: Ensure an effective maintenance and technical support mechanism				
6.5.1	Provide basic initial training to educators to ensure ICT resources are protected from end-user misuse	Number of educators trained in basic maintenance skills	IGE, DRFM	Ongoing until2026
6.5.2	Identify and train individuals in schools and offices to perform basic troubleshooting and minor repairs	Number of individuals from schools trained in basic maintenance skills	IGE, DRFM	Ongoing until2026
6.5.3	Perform preventive and predictive maintenance at regularly scheduled intervals	Schedules for preventive and predictive maintenance available	IGE, DRFM	Ongoing until2026
6.5.4	Establish a protocol for internal servicing and referring ICT hardware for outsourced servicing	Protocol for internal servicing and referring ICT hardware available	IGE, DRFM	Ongoing until2026
6.5.5	Implement a maintenance management system to track, schedule and cost the maintenance of ICT equipment	Report on the implementation of a maintenance management system	IGE, DRFM	Ongoing until2026

No	Activities	Indicators	Stakeholder	Timeframe
6.5.6	Compile and regularly revise a list of reputable technical service providers who can serve schools in their communities	Updated list for technical service providers available	IGE, DRFM	Ongoing until2026
Strategic objective 6.6: Encourage the local generation of revenue to maintain ICT equipment				
6.6.1	Encourage schools to use ICT resources in creative ways to generate funds	Number of schools generating funds with ICT resources	IGE, DRFM, local council	Ongoing until2026
6.6.2	Undertake community awareness programmes on the benefits of ICT competencies and encourage the use of school ICT facilities for a minimal fee	Number of community awareness programmes conducted	IGE, DRFM, local council	Ongoing until2026
6.6.3	Ensure that schools manage and account for revenue generated from community access programmes responsibly	Accountability report available from schools generating revenues	IGE, DRFM, local council	Ongoing until2026
Strategic objective 6.7: Ensure appropriate disposal of e-waste				
6.7.1	Develop an e-waste management framework	E-waste management framework available	Min of Environment, IGE, DRFM, local council	Dec 2023
6.7.2	Raise awareness of e-waste management in all schools	Number of awareness campaigns on e-waste management conducted	Min of Environment IGE, DRFM, local council	Dec 2023
6.7.3	Monitor and evaluate the e-waste disposal management framework	E-waste monitoring and evaluation report available	Min of Environment IGE, DRFM, local council	Dec 2023
7. Support for local council initiatives and partnerships **Goal:** Mobilise partners to support local councils and the government in the development of ICT in education				
Strategic objective 7.1: Recognise and support the role of MINEDUB and its partners in facilitating ICT initiatives in education				
7.1.1	Develop a communication strategy for public/private sector partners	Communication strategy framework available	IGE, DRFM, DPPC, CELCOM	Dec 2022
7.1.2	Develop an acquisition strategy for ICT equipment for schools	Acquisition strategy for ICT equipment available	IGE, DRFM, local council	Dec 2023
7.1.3	Acquire and distribute ICT equipment for schools and distance learning centres	Number of schools and distance learning centres equipped with ICT	IGE, DRFM, local council	Ongoing until2026
Strategic objective 7.2: Develop modalities for reducing costs of ICT products and services				
7.2.1	Source software cost-reduction options for schools from vendors/developers	List of software developers/vendors willing to sell software at a reduced cost available	IGE, DRFM, DPPC, local council	Dec 2023
Strategic objective 7.3: Encourage cost-sharing with parents and communities for establishing schools' ICT infrastructure				

No	Activities	Indicators	Stakeholder	Timeframe
7.3.1	Sensitise the community on ICT mainstreaming in schools	Number of sensitisation activities done to encourage the community to contribute to ICT in education	IGE, DRFM, DPPC, local council	Ongoing until2026
7.3.2	Mobilise the community to finance ICT infrastructure and connectivity	Amount of infrastructure and connectivity built by the community	IGE, DRFM, DPPC, local council	Ongoing until2026
8. Open and distance learning development **Goal**: Explore open, distance and e-Learning modes for the delivery of teaching and learning for all categories of pupils				
Strategic objective 8.1: Expand open, distance and e-Learning modes for both basic education and in-service teacher training				
8.1.1	Create open, distance and e-Learning centres at divisional delegations	Number of centres created	IGE, DRFM, DPPC, local council	Ongoing until2026
8.1.2	Equip the centres with the appropriate furniture and ICT	Number of centres appropriately equipped	IGE, DRFM, DPPC, local council	Ongoing until2026
8.1.3	Create instructional design and production centres at the central and devolved services of MINEDUB	Number of functional instructional design and production centres created	IGE, DRFM, DPPC, local council	Ongoing until2026
8.1.4	Appoint skilled staff to manage the centres	Number of personnel working in each centre	IGE, DRFM, DPPC, local council	Ongoing until2026
8.1.5	Develop and promote the use of e-libraries/online repositories, taking intellectual property into consideration	Number and types of resources accessible in the e-library	IGE, DRFM	Ongoing until2026
Strategic objective 8.2: Empower members of the pedagogic supervision chain with skills in open, distance and e-learning				
8.2.1	Train pedagogic supervisors to develop and evaluate digital content for teaching and learning	Number of pedagogic supervisors trained to compile and evaluate digital content	IGE, DRFM	Ongoing until2026
8.2.2	Train members of the pedagogic chain on distance and e-Learning instructional delivery methods	Number of educators trained to deliver distance and e-Learning instruction	IGE, DRFM	Ongoing until2026
8.2.3	Train educators and pupils on the use of the e-libraries/online repositories	Number of educators and pupils accessing the e-library	IGE, DRFM	Ongoing until2026
Strategic objective 8.3: Deploy appropriate content for open, distance and e-Learning				
8.3.1	Develop and digitalise content to supplement education delivery	Number of subjects with digital content	IGE, DRFM	Ongoing until2026
8.3.2	Develop and distribute knowledge resources (e.g. DVDs/CD-ROMs) to schools to supplement educational delivery	Number of schools benefitting from the knowledge resources	IGE, DRFM	Ongoing until2026
8.3.3	Share and exchange learning materials with other organisations/institutions	Number of resources shared/exchanged annually	IGE, DRFM	Ongoing until2026
8.3.4	Update the My School Online portal with curriculum-related content	Number of lessons accessible in the e-Learning portal	IGE, DRFM	Ongoing until2026
Strategic objective 8.4: Source and provide funds for the expansion of open, distance and e-Learning				
8.4.1	Allocate budget annually for updating learning resources and producing new content	Amount allocated annually for the development of distance education	IGE, DRFM, DPPC	Ongoing until2026

No	Activities	Indicators	Stakeholder	Timeframe
8.4.2	Partner with private sector organisations and encourage innovative e-content development practices and virtual learning environments	Number of partnerships and framework for innovative content production established	IGE, DRFM, DPPC	Ongoing until2026
Strategic objective 8.5: Institute learner support systems				
8.5.1	Create a helpdesk to provide support to online/radio/TV/print-based distance learners	Number of supports provided to learners annually	IGE, DRFM	Ongoing until2026
8.5.2	Setup distance learners support services at sub-divisional inspectorates	Annual report on the number and type of learner support services provided annually	IGE, DRFM	Ongoing until2026
9. Monitoring and Evaluation **Goal:** Ensure that activities are implemented as planned and respect the agreed norms and standards				
Strategic objective 9.1: Institute programmes and procedures to monitor and evaluate the implementation of the various components of the ICT education policy				
9.1.1	Establish criteria, indicators and benchmarks to assess the implementation and impact of ICT in education in collaboration with stakeholders	Assessment criteria and periodicity available	IGE, DRFM, DPPC	Ongoing until2026
Strategic objective 9.2: Develop instruments to monitor all interventions proposed in the strategy				
9.2.1	Evaluate the use and management of ICT tools, systems and procedures continuously	Evaluation report with appropriate recommendations available	IGE, DRFM, DPPC	Ongoing until2026
9.2.2	Institute a motivational award scheme for the efficient use, management and development of innovative ICT infrastructure and content	Number of awards made annually	IGE, DRFM	Ongoing until2026
9.2.3	Develop a standard guide to harmonise existing and future practices for ICT in education programmes	Standard guide for the use of ICT in education programmes	IGE, DRFM, DPPC	Ongoing until2026
9.2.4	Undertake continuous impact assessments on ICT in education teaching and learning every three years	Triennial ICT impact assessment report available	IGE, DRFM, DPPC	Ongoing until2026
9.2.5	Expand and strengthen EMIS in the collection and evaluation of data on ICT resources	Portal for the collection of EMIS data available	IGE, DRFM, DPPC	Ongoing until2026

Appendix: ICT Policy and Strategy Document Review Committee

GENERAL SUPERVISION
President: Professor Laurent Serge ETOUNDI NGOA, Minister of Basic Education
Assisted by: Dr Kilo Vivian Asheri, Secretary of State in the Ministry of Basic Education

General Coordinators
Mr OYONO Adams, SG-MINEDUB
Professor Atemajong Justina epse Njika, IGE-MINEDUB

TECHNICAL COORDINATOR
Professor Michael Nkwenti Ndongfack

Assisted by:
Mr Evang Joseph Assembe (IP/ Primary Education)
Mr Mih Julius (IP/Bilingualism)
Mrs Mamat Daiferle (IP/Nursery Education)
Mrs Ndayi Claudette (IP/LNFBEPNL)

Members
Mr Bernard TAME AZIE IPN -TE
Dr TABE John TAMBE IPN -TE
Mrs ONANA Catherine IPN -TE
Mr MBA Vincent MBABID IPN -TE
Mr ETOUNDI ONDOUA Jean Bernard IPN -TE
Mr ABOUBAKARY Halilou Chef CEL -INFO
Mr ATEBA ALEXANDRE Charge d'Etude DAJ

Secretariat

Mr BISSANI BESSALA Ange Guillaume Cadre IP -TE
Dr. MOCHE Georgette C. epse KENMOE Cadre IP -TE
Mrs KAGHO DEUDJIO Antoinette Marlyse Cadre IP -TE

Support Staff

Mrs ANUANO Delphine
Mrs MANDENG Charlotte
Mr DJOUTSOP Stéphane

REGIONAL CONTRIBUTORS

Mr ALIMA Paul **ICE ADAMAOUA**
Mrs YAMDJEU Léonie **ICE CENTRE**
Mrs MEZENI Mireille Sylvie épse NTSAMA KAMANDA **ICE EAST**
Mrs SOH née CHEKAM K. Chantal **ICE FAR NORTH**
Mrs WAFO née MAGNE Victorine **ICE LITTORAL**
Mr BIBAI NDIGUI **ICE NORTH**
Mr Wilson BANIYEH NGAM **ICE NORTH-WEST**
Mr OSSOUBITA Bernard **ICE SOUTH**
Mrs TITA Mercy TEBIT, épse AGIEN **ICE SOUTH WEST**
Mr FOKOUNG Domiel **ICE WEST**
Mrs Mbamulu Caroline **RPA TE South West**
Mr Wirngo Daniel **RPI TE North West**
Mr Konguep Collins **RPI TE Adamawa**
Mrs Clotilde Njembele **RPI TE Centre**