RÉPUBLIQUE DU CAMEROUN
Paix -Travail- Patrie
****
UNIVERSITÉ DE YAOUNDÉ I
****
FACULTÉ DES SCIENCES DE L'ÉDUCATION
****
DÉPARTEMENT DE MANAGEMENT
DE L'ÉDUCATION
****
CENTRE DE RECHERCHE ET DE
FORMATION DOCTORALE EN SCIENCES
HUMAINES, SOCIALES ET ÉDUCATIVES
****
UNITÉ DE RECHERCHE
ET DE FORMATION DOCTORALE
EN SCIENCES DE L'ÉDUCATION
ET INGÉNIERIE ÉDUCATIVE
****

REPUBLIC OF CAMEROON
Peace – Work - Fatherland
****
UNIVERSITY OF YAOUNDÉ I
****
FACULTY OF EDUCATION
****
DEPARTMENT
OF EDUCATIONAL MANAGEMENT
****
POST GRADUATE SCHOOL
FOR SOCIAL AND EDUCATIONAL
SCIENCES
****
DOCTORAL UNIT OF POST GRADUATE
RESEARCH AND TRAINING IN
EDUCATION AND EDUCATIONAL
ENGINEERING
****

The Education System and the Development of Skills for the Digital Economy: A Case Study of Secondary School Graduates in Cameroon

A thesis defended in public on April 4, 2024, in partial fulfilment of the requirements for an award of a Ph.D. in Educational Management
Specialisation: Education Systems Planner

by

ENGOZO'O Yvan Rony,

M.Ed. in Educational Management / Education Systems Planner,

Registration No. 15V3981

Members of jury

Position	Names and Surnames	University
President :	**TCHOMBE MUNGAH Therese,** Emeritus Professor	University of Buea
Rapporteurs :	**FOZING Innocent,** Full Professor	University of Yaoundé I
	MUTIA Rosalyn, Associate Professor	University of Yaoundé I
Members:	**BECHE Emmanuel,** Full Professor	University of Maroua
	FONKOUA Pierre, Full Professor	University of Yaoundé I
	NDJEBAKAL SOUCK Emmanuel, Associate Professor	University of Yaoundé I

April 2024

TITLE PAGE

The Education System and the Development of Skills for the Digital Economy: A Case Study of Secondary School Graduates in Cameroon

by

ENGOZO'O Yvan Rony

Supervisors:

Rosalyn MUTIA,
Associate Professor,
University of Yaoundé I

FOZING Innocent,
Professor,
University of Yaoundé I

APPROVAL

We hereby certify that this thesis entitled “The Education System and the Development of Skills for the digital economy: A Case Study of Secondary School Graduates in Cameroon” was carried out by ENGOZO’O Yvan Rony, it has been corrected in accordance with the comments of the jury to our satisfaction. We therefore recommend that this thesis be bound and copies deposited in the Faculty of Education of the University of Yaoundé I.

Signatories

President of jury	Examiners:
_____	_____
	_____
	_____
Supervisors	Head of Department
_____	_____
_____	

Date: __ / __ / 2024

DECLARATION

I, the undersigned, Mr ENGOZO'O Yvan Rony, student of Educational Management, Faculty of Education, University of Yaoundé I, registration number 15V3981, hereby acknowledge by this oath of probity and intellectual property that this piece of work is entirely the product of my mind, as well as the fruit of my intellectual investigations under the co-supervision and guidance of Prof. FOZING Innocent and Prof. MUTIA Rosalyn. It is therefore not, in any way subject to plagiarism or counterfeiting. All borrowings and exploited materials have been quoted and acknowledged by means of citations or references, in accordance with conventions in science at large and in my field of study in particular.

ENGOZO'O Yvan Rony

Date: _____

CERTIFICATION

This is to certify that the thesis entitled “The Education System and the Development of Skills for the digital economy: A Case Study of Secondary School Graduates in Cameroon” was carried out by Mr ENGOZO’O Yvan Rony, registration number 15V3981, in the Department of Educational Management, Faculty of Education, University of Yaoundé I, in partial fulfilment of the requirements of the award of Doctor in Philosophy Degree (Ph.D.) in Educational Management, Education Systems Planner, under our co-supervision and guidance.

Rosalyn MUTIA,
Associate Professor,
University of Yaoundé I

FOZING Innocent,
Professor,
University of Yaoundé I

In loving memory of my father Mr MBA MBEYO'O Aaron, who invested everything he had in my education but could not reap the fruits of his sacrifices.

ACKNOWLEDGEMENTS

I owe a debt of gratitude to my supervisors, Prof. Fozing Innocent and Prof. Mutia Rosalyn for their relentless efforts put in the guidance of this work as it evolved from manuscript through its final completion. They did not spare any efforts in shaping, correcting and reorienting my ideas for the production of this academic piece. Most importantly, they made my transition from a graduate student to a researcher much easier.

Special thanks to all the lecturers of the Faculty of Education of the University of Yaoundé I for the knowledge imparted in me in the course of my training. Among them, a special gratitude goes to late Dr Teneng for her remarkable contributions to this study.

My heartfelt gratitude goes to my beloved wife Essengue Essomba Regine who loves me unconditionally and encourages me when I am disheartened. She shared with me the ups and downs of this journey. She smiled and laughed with me whenever there were exciting new results coming out. Her encouragement and sacrifices made this process an enjoyment, and to my children for their patience all along this programme.

My deepest gratitude also goes to my mother, sisters and brothers for their endless love, encouragement and support.

I am also grateful to the staff of the Ministry of Secondary Education, the Ministry of Higher Education, the Ministry of Post and Telecommunications and the Ministry of Economy, Planning, and Regional Development for granting me access to collect the data that were used in this thesis.

This research would be a very difficult journey without the support from my professional hierarchy: Prof. Laurent Serge Etoundi Ngoa, Mrs Elobo Lisette Catherine, Dr Minfoumou Olo Louise Epse Edou, Mrs Abanda Metogo Stephanie, Mr Atangana Kouna Hervé Patrick (of late), and colleagues: Mr Akomezoa Ateba Alexandre, Mrs Mfomo Madeleine, Mr Noah Okali II Yves, Mr Amang Fleuron, Mrs Essomba Ernestine, Mr Abre Joseph, Mrs Mendimi Emma Laure and Mr Bengono Evini Maxwell.

ABSTRACT

This study was designed to find out the extent to which the education system influences the development of skills for the digital economy amongst secondary school students in Cameroon. Our purpose was to investigate the elements of the education system that significantly correlate with secondary school students' development of skills for the digital economy. The following question has guided our investigation: to what extent does the education system influence the development of skills for the digital economy amongst secondary school students in Cameroon? The answer to this question is our general hypothesis which declares that the education system significantly influences the development of skills for the digital economy amongst secondary school students in Cameroon. The operationalization of this general hypothesis has generated five (05) research hypotheses.

The collection of data was done through (i) a questionnaire administered to a sample of eight hundred and sixty-five (865) freshers and sophomores randomly selected from nine (09) series in four (04) state universities, (ii) a participant observation at the Distance Learning Centre and (iii) interviews to selected officials of central and devolved services of the Ministry of Secondary Education.

The data were analysed using descriptive tools, the Pearson correlation coefficient and multiple regressions. We made use of the Statistical Package for Social Sciences (SPSS) at 0.05 level of significance. Findings confirmed the five (05) hypotheses with Pearson's correlation coefficient $r = 0.881$, $r = 0.894$, $r = 0.919$, $r = 0.949$ and $r = 0.762$ respectively, with $P = 0.000 \leq 0.00005$.

The results were interpreted using the Experiential Learning Theory and Design Models of Kolb (1984), the Technological Pedagogical Content Knowledge of Mishra and Koehler (2006), the Unified Model of the Human Capital Theory for the 21st Century Industry of Peña (2020) and the Signalling Theory of Spence (1973) which made us to understand that policy design, programmes and curricula, governance/implementation plan, infrastructure and equipment and teaching methods are the main avenues through which the education system adequately equips secondary school students with skills for the digital economy. The findings of this study led us to make proposals to parliamentarians, senators, Regional and Local Authorities, the private sector, technical and financial partners, civil society organisations and education stakeholders to take into account in order to equip secondary school students in particular, pupils and learners of the Cameroon Education and Training Sector at large, with 21st century skills.

Key words: 21st century skills, digital economy, policy design, programmes and curricula, e-governance, digital infrastructure and equipment, teaching methods.

RÉSUMÉ

La présente étude a été menée dans le but de déterminer le lien qui existe entre le système éducatif et le développement des compétences pour l'économie numérique chez les élèves des Enseignements Secondaires au Cameroun. L'objectif poursuivi était d'étudier les leviers du système éducatif qui ont une corrélation significative avec le développement des compétences pour l'économie numérique chez ces élèves. La question suivante a guidé notre investigation : dans quelle mesure le système éducatif influence-t-il le développement des compétences pour l'économie numérique chez les élèves du secondaire au Cameroun ? La réponse à cette question constitue notre hypothèse générale qui stipule que le système éducatif influence significativement le développement des compétences pour l'économie numérique chez les élèves du secondaire au Cameroun. L'opérationnalisation de cette dernière nous a permis d'obtenir cinq (05) hypothèses de recherche.

La collecte des données a été faite à travers (i) un questionnaire administré à un échantillon de huit cent soixante-cinq (865) étudiants de première et de deuxième années Licence, sélectionnés au hasard au sein de neuf (09) filières de quatre (04) universités d'Etat au Cameroun ; (ii) une observation participative au Centre d'enseignement à distance ; et (iii) des entretiens avec certains responsables des services centraux et déconcentrés du Ministère des Enseignements Secondaires.

Les données recueillies ont été analysées en utilisant des outils descriptifs, le coefficient de corrélation de Pearson et des régressions multiples. Nous avons fait usage du logiciel Statistical Package for Social Sciences à un niveau de significativité de 0,05. Les résultats obtenus ont confirmé les cinq (05) hypothèses avec des coefficients de corrélation de Pearson $r = 0,881$, $r = 0,894$, $r = 0,919$, $r = 0,949$ et $r = 0,762$ respectivement, étant donné que $P= 0,000 \leq 0,00005$.

Les résultats ont été interprétés à l'aide de la théorie de l'apprentissage expérientiel de Kolb (1984), du cadre de connaissance du contenu pédagogique technologique sur les résultats d'apprentissages de Mishra et Koehler (2006), du modèle unifié de la théorie du capital humain pour l'industrie du 21ème siècle de Peña (2020) et de la théorie de la signalisation de Spence (1973). Ce qui nous a permis de comprendre que la conception de la politique, les programmes et curricula, la gouvernance/plan opérationnel de mise en œuvre, les infrastructures/équipements et les méthodes d'enseignement sont les principaux leviers sur lesquels le système éducatif s'appuie pour équiper les élèves du Secondaires en compétences nécessaires pour le développement de l'économie numérique. Les résultats de cette étude nous ont amenés à faire des propositions aux membres du parlement camerounais, aux Collectivités Territoriales Décentralisées, au secteur privé, aux partenaires techniques et financiers, aux organisations de la société civile et aux acteurs de l'éducation afin de doter nos élèves du secondaire en particulier, les écoliers et apprenants du Secteur de l'Education et de la Formation du Cameroun en général, en compétences du 21ème siècle.

Mots clés : compétences du 21ème siècle, économie numérique, conception des politiques, programmes and curricula, gouvernance digitale, infrastructures/équipements digitaux, méthodes d'enseignement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHS

ABBREVIATIONS, ACRONYMS AND INITIALISMS

ADSL	Asymmetric Digital Subscriber Line
AfCFTA	Africa's Continental Free Trade Area
Ally	Previously called Blackboard Ally. Accessibility checker for content in Canvas - it helps to build a more inclusive learning environment and improve the students' experience by promoting accessibility and usability.
BUCREP	National Bureau for Censuses and Populations
Cabinet	Online platform designed to support the use of objects and images for teaching
CalssVR	Virtual and augmented reality platform that can bring complex subject matter to life
CAMTEL	Cameroon Telecommunications
CEP	Certificat d'Etudes Primaires
CESA	Continental Education Strategy for Africa
CPC	Community Preschool Centre
DAT	Disruptive Agricultural Technologies
DFS	Digital Financial Services
EFA	Education For All
ELT	Experiential Learning Theory
EPA	Education Priority Area
ETSS	Education and Training Sector Strategy
FOSS	Free and Open-Source Software
FSLC	First School Leaving Certificate
GBHS	Government Bilingual High School
GDP	Gross Domestic Product
GCE	General Certificate of Education
GEM	Global Education Monitoring
GHS	Government High School
GITR	Global Information Technology Report

GTTC	Government Teacher Training College
GTTTC	Government Technical Teacher Training College
H5P	Tool for creating interactive learning objects that can be used for teaching a variety of subjects
HCDI	Human Capital Development Initiative
HCT	Human Capital Theory
HDI	Human Development Index
HTTC	Higher Teachers' Training College
HTTTC	Higher Technical Teachers' Training College
ICTs	Information and Communication Technologies
IDA	International Development Association
IDI	ICT Development Index
IGAs	Income Generating Activities
NIS	National Institute of Statistics
Inspera	E-Assessment platform - it offers authoring and marking functionality
IPPF	Indigenous Peoples Planning Framework
LaTeX Math Editor	Basic mathematical formatting in Canvas
LMD	Licence-Masters-Doctorat
LNFBE	Literacy and Non-Formal Basic Education
MDG	Millennium Development Goal
MINEDUB	Ministry of Basic Education
MINEPAT	Ministry of Economy, Planning, and Regional Development
MINESEC	Ministry of Secondary Education
MINESUP	Ministry of Higher Education
MINPOSTEL	Ministry of Post and Telecommunications
MINRESI	Ministry of Scientific Research and Innovation
Miro	Online collaboration and whiteboarding platform that allows you to create notes and designs, move things around, and communicate through embedded video calls or chats

MS Teams	Chat-based digital workspace that is part of Office 365; it has been designed specifically to address the needs of virtual teams by acting as a hub for chat, calls and online meetings.
MTN	Mobile Telephone Networks
NDS30	2020 - 2030 National Development Strategy
NIS	National Institute of Statistics
NUSA	National Unit of Learning Outcomes
OER	Open Educational Resources
ORANGE	A mobile telecommunication operator created in 2000 in Cameroon
PATNUC	Programme for the Acceleration of the Digital Transformation of Cameroon
PEA	Priority Education Area
PISA	Programme for International Student Assessment
PPP	Public-Private-Partnerships
Rapidmooc	A quick and simple way to record instructional videos in front of a green screen; no specialist skills or post-production required
Replay	Also known as Panopto, this device helps to automatically record a lesson, a lecture or a seminar.
RESEN	State's Report on the National Education System
SDG	Sustainable Development Goal
SGE	Secondary General Education
SME	Small and Midium-size Enterprise
SPSS	Statistical Package for Social Sciences
Turnitin	Electronic text matching system that can be used to find text matches between submitted student papers and existing digital resources such as journal articles, webpages and previous student submissions
TPACK	Technological Pedagogical Content Knowledge
TVT	Technical and Vocational Training
UIS	UNESCO Institute for Statistics
USD	United States Dollar
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNICEF	United Nations Children's and Education Fund
Vevox	Platform for live polling, QandA, word clouds and quizzing helps to get instant feedback from students
WBG	World Bank Group
WebLearn	Virtual Learning Environment
WEF	World Education Forum

GENERAL INTRODUCTION

Education is the process of teaching or acquiring knowledge, skills, and values (Chireshe, 2006). In other words, it enables learners to acquire knowledge and skills that will help them to become successful members of the society. Therefore, education is not limited to instruction (Pure knowledge), but also aims at developing abilities, skills and attitudes for social or professional integration. According to Trilling and Fadel 2009, "education plays four universal roles on society's evolving stage: (i) it empowers us to contribute to work and society, (ii) exercise and develop our personal talents, (iii) fulfil our civic responsibilities, and (iv) carry our traditions and values forward". These are the "great expectations," the big returns we want from our investments in education. Put another way, the latter are the four universal targets we expect the education system to achieve.

One of the strategic areas of economic development at the present stage is the development of the digital economy, which is beneficial to the activities of business entities in particular and the society in general. It permits to obtain finance with the use of digital technologies, develop e-commerce and services, and develop good communications with partners for the prompt release of up-to-date information to a wide range of users or customers.

The digital economy leads to a change of people's daily lives, industrial relations, economic and education structures. Its development requires the formation of new competencies, which each business entity must have. Increasing use of digital technologies at work is raising the demand for new skills along three lines: human skills, digital building-block skills and business-enabler skills. These skills are crucial to enable effective use of digital technologies by all individuals in their daily lives.

To ensure that Cameroonians can engage in digital activities and adapt rapidly to new and unexpected occupations and skill needs, an analysis of the formal education system is of utmost importance. To cope with the increasing pace and change of modern life, secondary school students need the above-mentioned foundational skills for the digital economy.

That being said, the education system should include the acquisition of skills for the digital economy so as to achieve societal and professional integration. The educational process is meant to develop students' intellectual, emotional and social capacities and enable them to fully adapt and face the challenges of life in the community to which they belong. Unfortunately, our schools' main focus is on developing children's score, academic knowledge and skills in literacy, numeracy, and a

range of curriculum subjects most often at the expense of the acquisition of skills for the digital economy which should be learnt in and out of a book or a school.

The successful insertion of youths into the job market is increasingly becoming difficult today, especially in Cameroon wherein the educational system is largely general in nature and consequently contributes less in the development of necessary skills or expertise needed by a fast-growing competitive labour market.

The main objective of this research is to determine the extent to which the education system influences the development of skills for the digital economy amongst secondary school students in Cameroon. To achieve this, we used the Experiential Learning Theory (ELT) and Design Models, the Technological Pedagogical Content Knowledge (TPACK) framework on learning outcomes, the Unified Model of the Human Capital Theory for the 21st Century Industry of Peña (2020) and the Signalling Theory of Spence (1973). The data were analysed with Pearson's correlation test and the multi-regression analysis. Based on previous empirical research, we generated a main research hypothesis and five research hypotheses. The general research hypothesis was formulated as follows: the education system influences the development of skills for the digital economy amongst secondary school students in Cameroon. This study is divided into two parts of three chapters each. Part one encompasses an introduction, a review of related literature and the methodological framework. Part two presents and analyses primary data, summarises the results, discusses findings, and finally makes proposals. The whole thesis is made up of six chapters.

Chapter one presents the research problem, objectives, questions and hypotheses. It also includes the significance of the research, delimitation of the study and the definition of key concepts. Chapter two deals with the review of literature related to the development of skills for digital economy, and elaborates the theoretical framework we used in this study. Chapter three is concerned with the methodology used in the research work. It presents the research design, population and sample of the study, sampling techniques, instruments and data collection plan, data analysis methods and a recapitulative table including variable and indicators of study. In chapter four, we organize the data, present our results and describe them. Chapter five deals with the summary of findings and discussion of results. Chapter six makes proposals to improve on the development of skills for the digital economy in Cameroon and suggests areas for future research.

PART ONE: SITUATIONAL ANALYSIS ON THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY IN CAMEROON SECONDARY EDUCATION

CHAPTER ONE: INTRODUCTION TO DIGITAL SKILLS DEVELOPMENT

This chapter presents the context and background of the study, the research problem, the objectives, the research questions and hypotheses. It also includes the significance of the research, the delimitation of the study and the definition of key concepts.

1.1. Context and Background of the Study

1.1.1. Cameroon Education System: An Overview

1.1.1.1. Demographic Context

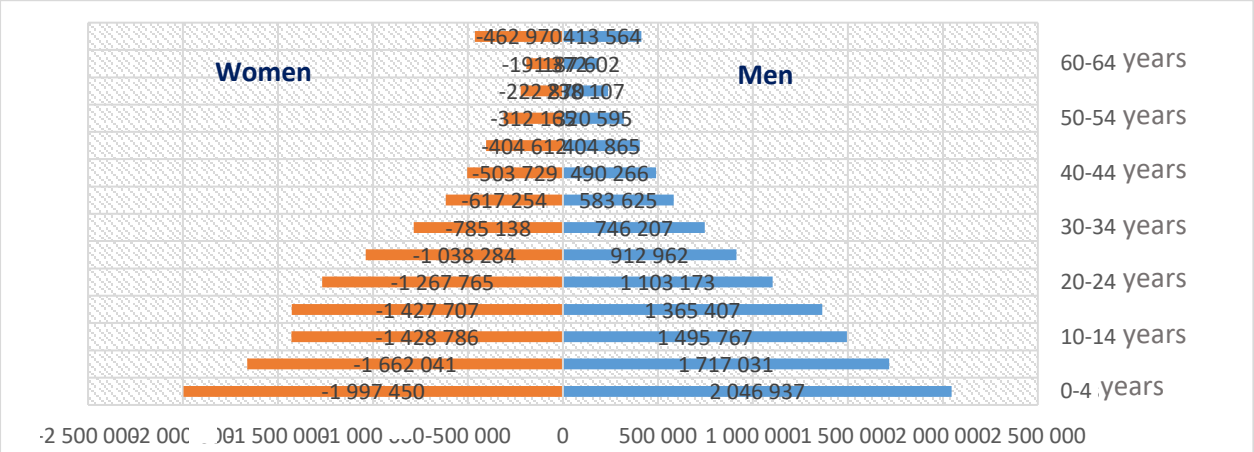
Based on BUCREP analyses and projections, Cameroon's population has been growing at an average annual rate of 2.4% since 2020. From 26,133,018 inhabitants in 2020 to approximately 27,419,118 and 28,088,863 inhabitants in 2022 and 2023 respectively. The population is expected to reach 29,442,318 in 2025. There is a slight predominance of women in the population over the period 2020 - 2025.

Table 1: population growth in Cameroon over the 2020-2025 period (NIS, 2022)

Year	2020	2021	2022	2023	2024	2025
Women	13,229,669	13,558,164	13,894,211	14,236,246	14,586,233	14,967,447
Men	12,903,349	13,207,346	13,524,907	13,852,617	14,172,269	14,474,871
Total	**26,133,018**	**26,765,510**	**27,419,118**	**28,088,863**	**28,758,502**	**29,442,318**
Annual Growth rate	2.42%	2.44%	2.44%	2.38%	2.38%	2.38%
% of women	50.62%	50.66%	50.67%	50.68%	50.72%	50.84%

An analysis of the age structure of the Cameroonian population reveals a population that is extremely young. The age pyramid is characterised by a very broad base and a gradual and regular narrowing as age advances. Graph 1 below shows the continuity of the widening of the age pyramid between 2005 and 2019.

Graph 1: Cameroon population per age group and sex in 2019 (NIS, 2019)



The strong population dynamics is borne by the fertility which is still high with a rate estimated at 4.4 children per woman, declining very slowly, and it is translated by a preponderance of the youth age brackets. The structure per age of Cameroon's population has the pyramidal shape, a feature of growing populations. 42% of Cameroonians have less than 15 years, half has less than 19 years and 70% have 30 years. As for the elderly (60 years and more), they represent only 4.9% of the country's total population.

The spatial distribution of this population shows that 54.2% live in urban areas while 63.7% are concentrated in four regions: Centre (18.6%), Far-North (18.3%), Littoral (15.2%) and North (11.5%). The less populated regions are the East (4.3%) and South (3%).

The increase of generations leads to growing education needs. The increasing number of children and youths of school going age implies the necessity for constantly increasing school supply. Population growth, with a slight rise, ought to continue in the years to come to settle around +2.3% annually. To maintain the current coverage and improve on schooling conditions, the education system will imperatively continue to increase its intake capacity commensurate with the school-age population.

During the 2016-2022 period, the school-age population moved from 12.1 million to 13.8 million, thus representing an annual growth rate of 2.1%. In 2022, it represented 50.5% of the country's total population.

Table 2 shows that children under 15 represent 42% of the population and those under 30 are estimated at 70%. The school-age population (4-23) represents 53% of the population for an estimated total of 12.8 million inhabitants in 2019 compared to 9.4 million in 2005, which corresponds to an average annual growth of 2.3%. These figures indicate, on the one hand, the

significant weight of children and young people to be enrolled in school for the adult population of working age, which in fact provides the financing; and, on the other hand, the Demographic weight that this age group exerts on the education system in terms of school provision. According to BUCREP projections, it will reach almost 14.4 million in 2025.

Table 2: Projected school-age population per group from 2005 to 2025 (BUCREP, 2015)

Age group	**2005**	**2015**	**2019**	**2020**	**2025**
Overall population	**17,766 ,561**	**22,179,707**	**24,348,251**	**24,910,305**	**27,840,083**
3-5	1,637,682	2,094,826	2,236,405	2,290,054	2,438,309
6-11	2,860,362	3,713,556	3,961,245	4,059,653	4,232,781
12-15	1,708,700	2,120,693	2,322,712	2,369,058	2,595,616
16-18	1,181,046	1,427,916	1,581 ,241	1,616,749	1,904,771
19-24	2,036,104	2,509,939	2,774,301	2,847,188	3,209,774
Total	**9,423,894**	**11,866,930**	**12,875,904**	**13,182,702**	**14,381,251**

1.1.1.2. Institutional Environment

Law No. 98/004 of 14 April 1998 to lay down guidelines on education in Cameroon provides in section 15 that (1) the education system is organised into two subsystems: the English-speaking and the French-speaking, by which the national option of biculturalism is reaffirmed; (2) the above-mentioned education sub-systems coexist, each preserving its specific methods of evaluation and award of certificates.

Within these two subsystems, there are two orders of education: public and private. The private sector includes the following sub-orders: secular, denominational Catholic, denominational Protestant and denominational Islamic.

Demographically, the schools are located in rural and urban areas. Pupils are unevenly distributed in the different administrative divisions. Thus, the schools in the large cities and their outskirts have a large number of pupils, which makes it necessary to resort to a system of double shifts (half-time).

To reduce these inequalities, the authorities have set up certain localities as Priority Education Areas (PEAs), notably the East, Adamawa, North and Far North regions. However, despite the efforts made by the Government with the support of its development partners, many pockets of under-schooling remain in the other regions and major cities of the country. Moreover, the need for teachers persists and requires recourse to the multigrade class system.

Article 161 of Law No. 2019/024 of 24 December 2019 on the General Code of Regional and Local Authorities further strengthens the institutional environment of education in Cameroon, in the sense that since the advent of decentralisation, the State has proceeded to transfer certain competences to Local and Regional Authorities, such as in the areas of Education (161.a.), Literacy (161.b.) and Technical and Vocational Training (161.c.). The aim is to ensure participatory management of education and training structures by the regional and local authorities.

1.1.1.3. Organisational Environment

Cameroon' fragmented education system is mainly administered by six ministries. They include:

- ✓ the Ministry of Basic Education (MINEDUB);
- ✓ the Ministry of Secondary Education (MINESEC);
- ✓ the Ministry of Employment and Vocational Training (MINEFOP);
- ✓ the Ministry of Higher Education (MINESUP);
- ✓ the Ministry Youth Affairs and Civic Education (MINJEC);
- ✓ the Ministry of Scientific Reasearch and Innovation (MINRESI).

The Cameroon education system is structured around several types and paths of education both formal and informal. The formal path goes from preschool education to higher education whereas the informal path is made up of literacy aspect meant for illiterate adults as well as extra school teaching programmes and vocational learning meant for out-of-school youths or those who have never gone to school.

• **Preschool** is the first type of education. It hosts children of four (04) years of age, for a duration of 2 years. This duration can go right up to three (03) years, especially in the private sector. It comprises two sub-systems (anglophone and francophone). It is ensured by specific institutions (nursery schools, kindergartens, day care centres, early childhood development centres…) whose conditions for creation, opening and modalities of operation are laid down by regulatory instrument. It seems increasingly essential to enable all the children to be well prepared to enter the primary cycle, the regulatory instruments do not ''explicitly'' assign an obligatory character to it.

• **Primary education** was rendered constitutionally obligatory in 1998, and begins officially at the age of six (6) years. It lasts for six (06) years and ends up with the award of the FSLC (First School Leaving Certificate) in the anglophone sub-system and the award of the CEP (Certificat d'Etudes Primaires) in the francophone sub-system.

• **Secondary education** receives graduates of primary school and comprises two sub-systems (anglophone and francophone) and three type of education (general, technical and teacher training).

• **Secondary General Education (SGE)** has the same duration in the two sub-systems (07 years) but the structure of the two cycles differs with five (05) years of studies for the first cycle, then two (02) years for the second in the anglophone sub-system, as compared to four (4) years of studies for the first cycle, then three (03) years for the second in the francophone sub-system. The first cycle of francophone secondary general education is sanctioned by the award of the BEPC and by the General Certificate of Education Ordinary Level (GCE O Level) in the anglophone sub-system. The second cycle is sanctioned by the award of the Baccalauréat in the francophone sub-system and by the General Certificate of Education Advanced Level (GCE A Level) in the anglophone sub-system. Worthy of note is the fact that in the class of 'première', the 'probatoire' examination conditions access to 'terminale'.

• **Secondary Technical and Vocational Education (STVE)** of the francophone sub-system is broken down into two cycles, respectively of 4 and 3 years of studies; it is sanctioned by the award of the CAP (Certificat d'Aptitude Professionnelle) for the 1st cycle, and the 'Baccalauréat Professionnel' and 'Brevet de Technicien' for the second cycle. In the anglophone sub-system, STVE has the same structure as SGE.

• **Teacher training**, notably preschool and primary is done through teacher education which is integrated to the secondary education type and taught in specialised institutions such as government teacher training colleges (GTTCs) for general education or technical education (GTTTCs). Holders of the CAPIEMP (Teacher's Grade One Certificate) thus become ''preschool and primary cycle educators'' after three (03) years of training for holders of the G.C.E. Ordinary Level, 2 years for holders of the 'probatoire' certificate and one (01) year for holders of the G.C.E. Advanced Level. Conversely, holders of the (Teacher's Grade One Certificate in technical education) are deployed in Industrial and Technical Colleges (GTCs), Rural Artisan as well as Home Economics Sections after three (03) years of training for holders of the CAP (Certificat Aptitude Professionelle), 2 years for holders of the 'probatoire technique' (end-of-lower sixth examination in technical education) and 1 year for holders of the G.C.E. Advanced Level or G.C.E. A/L in technical education.

It should be noted that Decree no. 2023/434 of 04 October 2023 brings a new dawn by leveraging all admissions into Government Teacher Training Colleges to the Baccalauréat and GCE Adavanced Level for a two-year training.

• **Vocational training**. The legal framework of vocational training was enriched with recent instruments which enshrine MINEFOP as the main provider of vocational training in Cameroon. It notably relates to Law No. 2018/010 of 11 July 2018 governing vocational training in Cameroon and its implementation instruments, which lay down the general legal framework as well as fundamental guidelines for vocational training. As such, the scope of vocational training which is made up of a set of post-basic education training is provided either by government institutions or private institutions approved by the State. It aims to give to learners and apprentices through pre-service, continuous vocational training or apprenticeship, knowledge, skills and aptitudes necessary for the practice of a trade and/or enabling to have access to a job.

It entails giving a best place to vocational skills in the growth and employment strategy through an efficient and well-harnessed vocational training mechanism. In fact, Government intends to: step up training offer; significantly improve vocational training quality by targeting promising trades; rationalise the vocational training system (for example by setting up job training centres in lieu of rural artisan as well as home economics sections (SAR/SM)) and renovate profession and apprenticeship systems.

At institutional level, vocational training in Cameroon supervises more than 300,000 youths each year and it is managed by several ministries, consular chambers and professional organisations.

The initial training cursus is made up of three (03) levels, notably:

1st level of training: labourers/employees (semi-qualified/specialised labourers, qualified labourers/employees and very qualified labourers/employees);

2nd level of training: supervisory staff (professional technicians and technicians);

3rd level of training: cadres (junior and senior managerial staff).

Moreover, MINEFOP manages a private and public mechanism. The latter is made up of the Rural Artisan/Home Economics Sections (SAR/SM), Rapid Vocational Training Centres (CFPR), Excellence Vocational Training Centres (CFPE) and Job training Centres (CFM). Private training centres on their part are of three types: Rapid Private Vocational Centres; Private Training Centres in professional environment and apprenticeship workshops.

Finally, it offer the following types of training to the general public:

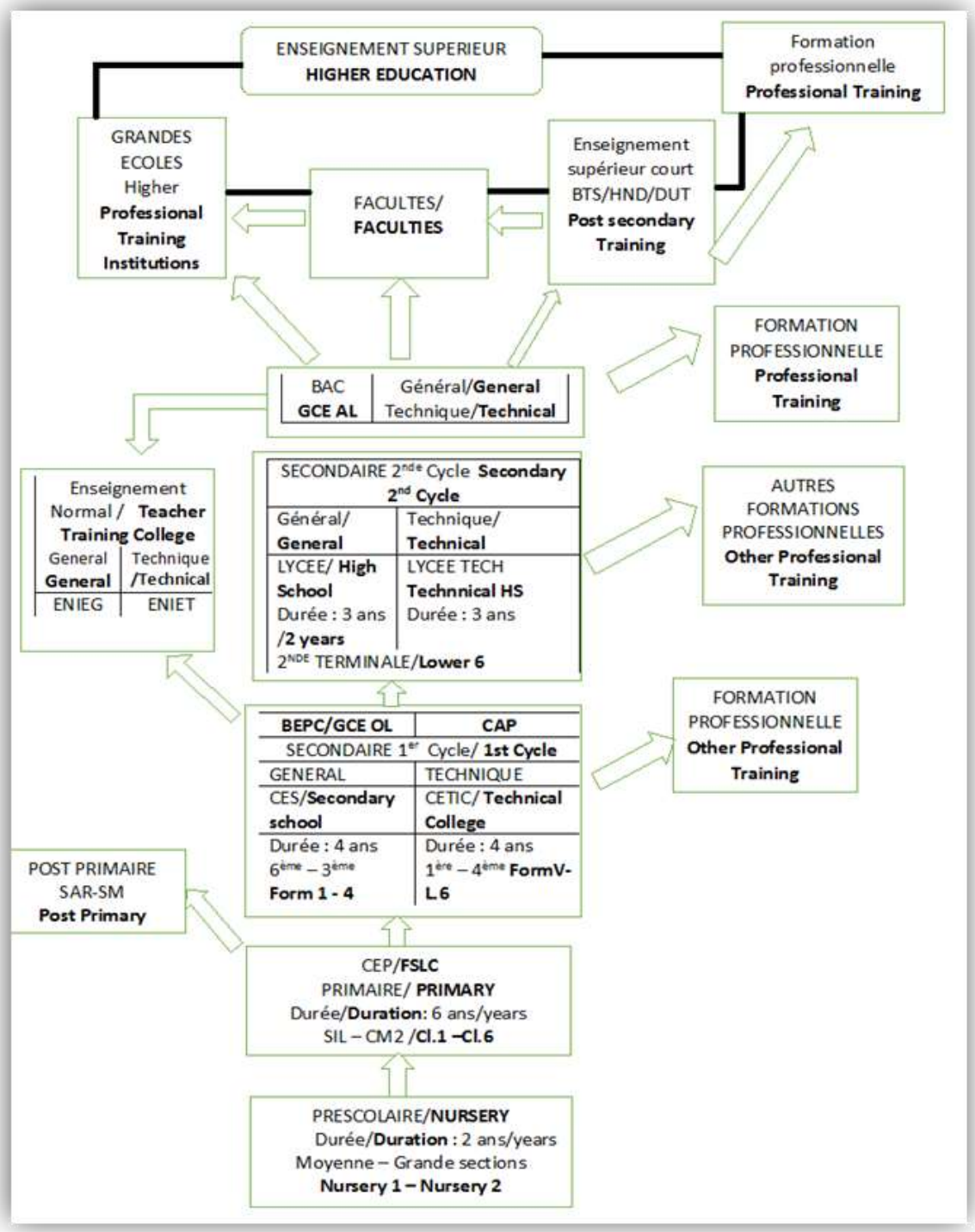
- ✓ Pre-service Training (PST): training acquired at three levels: within the education and apprenticeship frameworks as well as experience acquired within the enterprise. Maximum duration of two (02) years;

- ✓ In-service Training (IST): short training (of a maximum duration of six months) meant to comfort, improve or acquire professional knowledge in a module or specific area;
- ✓ Training through Apprenticeship (TA): it is an alternate training offered between a classical teaching institution and an enterprise on the basis of an employment contract. It should be pointed out that this is a diploma course;
- ✓ Alternate Training (AT): understood as a dual education system which combines apprenticeship in a company and vocational education at a vocational school in one course;
- ✓ Open and Distance Learning (ODL): it represents online training or e-learning. Courses are taught using a discussion platform which has obtained prior authorisation for online enrolment in a centre of the area.

• **Higher Education** is the terminal part of Cameroon's education system. Generally speaking, the education sub-sector has three levels of teaching: Bachelor-Master-Doctorate. According to Law No.005 of 16 April 2001, higher education consists of all post-secondary teaching and training offered by public institutions of higher education and private institutes of higher education accredited as higher institutions by the State. In addition to this two types of institutions, Cameroon higher education has institutions with special status and transnational institutions, the fruit of cooperation ties and the opening-up of this teaching system. As such, the Cameroon university system is a binary type: there are classical faculties, on the one hand; and professional schools, on the other hand. Classical faculties freely enrols students who are holders of the GCE A-Level, the 'Baccalauréat", and any other recognised equivalent certificate/diploma. Yet, access to professional schools as well as into private institutions is subject to succeeding at a competitive entrance examination. In this sub-sector, there is no distinction between the anglophone and francophone sub-systems

In 2022, higher education had ninety six (96) public institutions, including: eight (08) training in teacher education (04 HTTC and 04 HTTTC); seven (07) training in medicine; five (05) training in agriculture, forestry, sylviculture, fauna, water and sanitation; three (03) training in livestock, fisheries, aquaculture and seafaring jobs; eleven (11) training in energy, mining, industry, and public works; four (04) national advanced schools of engineering; four (04) institutions training in tourism, urban development, international relations and translation; three (03) training in culture; one (01) training in journalism; five (05) training in commerce and logistics; ten (10) faculties of science; ten (10) faculties of letters, art and social sciences; ten (10) faculties of economics and management sciences; ten (10) faculties of law and political science; four (04) faculties of education.

Graph 2: Organisation of Cameroon education system (ETSSP 2013-2020)



1.1.2. Digital/ICT Education Policies in Cameroon

The use of a diverse set of technological tools and resources in education in Cameroon is governed by a good number of international and domestic commitments.

1.1.2.1. International Commitments

At the international stratum, the Cameroon government has a good number of engagements in relation to digital/ICT education. These entail: the Incheon Declaration and Framework for Action for the implementation of Sustainable Development Goal 4 (SDG4), the Muscat Agreement, the Qingdao Declaration (2015), the 2017 Qingdao Statement, the Commonwealth of Learning baseline and the Continental Education Strategy for Africa 2016 – 2025 (CESA 16-25).

i. The Muscat Agreement

The Muscat Agreement is an offshoot of the Global Education Monitoring pertaining to EFA (Education For All), a global education initiative that germinated in Jomtien in 1990, and received grounded confirmation in Dakar, Senegal in 2000. Held in Muscat, OMAM, in 2014 by world education stakeholders, this meeting acknowledged that EFA and the Millennium Development Goals (MDGs) have been the most important commitment to education in recent decades and have driven education to significant progress. Yet, it was still realized that hundreds of millions of learners were still lagging behind in terms of basic education, and education of the girl child most particularly in middle and less developed countries. As a matter of fact, an estimated 250 million children were unable to read, write or count well even after spending at least four years in school. Moreover, key issues that remained staked are persistent inequalities in access, the state of access, non-completion of formal schooling, weak skills levels, and relevance to the job market needs.

What was most attracting in this meeting was that every stakeholder acknowledged the need of a new type of education that equipped learners with the skill set to respond to an uncertain future. In this light, the stakeholders reiterated as follows:

> "*We acknowledge that future education priorities must reflect the significant socio-economic transformations that have occurred since the adoption of the EFA and the MDGs and the changing requirements in the type and level of knowledge, skills and competencies for knowledge-based economies. Therefore, we recognize that there is a strong need for a strong and forward-looking education agenda that completes unfinished business while going beyond the current goals in terms of depth and scope as well as to provide people with the understanding competencies and values they require to address the many challenges that our societies and economies are facing"*
>
> UNESCO (2014: 2)

The above trend by world leaders saw the need to fill the gaps of the past years as noticed in the GEM (Global Education Monitoring) report. This implies that stakeholders were called upon to

lay down education mechanisms that meet the exigencies of changing times. In this light, since Cameroon participated and endorsed this commitment, the local education policy design ought to pay particular attention to these gaps. The extent to which this has been applicable in Cameroon's education system will be determined based on this study's results.

ii. The Incheon Declaration and Framework for Action

In May 2015, global education stakeholders converge on Incheon, Korea to finalize the grounds of how to implement a new post-2015 Education agenda. This new vision is fully captured by the proposed SDG 4 *'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'* and its corresponding targets. According to UNESCO (2015) This new vision for education is transformative and universal. It also attends to the "unfinished businesses" of the EFA agenda and the education-related MDGs, and addresses global and national education challenges. According to Béché (2019), the appropriation of ICT by key education stakeholder is central to the achievement of the SDG4 targets of inclusive and equitable quality learning, and lifelong learning as well. This author estimates that accordingly more importance to technology in today's education is critical to developing the type and nature of skills needed by today's job market. This is corroborated by Njebakal and Teneng (2017) as they posit that ICT constitutes an inevitable component in the drive for reducing skill mismatch among graduates.

It suffices to note that the 2030 education agenda recognizes education as key to achieving full employment and poverty eradication. To this, Ngu and Teneng (2020) resolved that education constitutes the basis for every societal transformation. These authors concluded that education policy makers, planners and managers should endeavour to rise up to the problem set by the fourth industrial revolution. It is based on these premises that this policy instrument is considered relevant in this study as it guides global and local education policies on the required ingredients and methodology. The most important question that remains to be answered is if Cameroon has been able to align her education policy to these commitments. However, field results will determine the degree to which the latter have been effective and efficient.

iii. From the 2015 Agenda of sustainable Development to the Qingdao Declaration (2015) and Qingdao statement (2017)

The 2015 agenda for sustainable development is a historic international meeting that resulted in 17 SDGs and 169 targets to be achieved by 2030. It refocused the former visions to hit a trio of targets: *people*, *planet* and *prosperity*. This agenda reaffirmed the crucial role technology plays in achieving SDG 4 with key pillars as access, equity, quality, inclusion and lifelong learning, and other

goals. Also, it should be noted that five of the sustainable Development Goals: enhancing gender equality (Goal 5), infrastructure (Goal 9), reducing inequalities among and across countries (Goal 10), enhancing peace, justice and strong institutions (Goal 16) and ensuring partnership for the goals (Goal 17), have universally been carved out as ICT related targets.

It suffices to note that two international meetings with direct focus on the integration of ICT in classrooms were held in 2015 and 2017 respectively by UNESCO.

- First, there was the ***Qingdao declaration-2015***. Given the remarkable role of ICT in today's society and considering the imperativeness of digital skills for everyone, UNESCO convened an international conference on ICT and post-2015 Education from 23 to 25 May 2015 in Qingdao, the People's Republic of China. This conference had as main aim to reflect on how to unleash the full potentials of ICT for education and achieving the sustainable development goals. Among various outcomes, this conference recognized that the ability to leverage ICT for learning is no longer a specialized skill, it is foundational to succeed in today's society. It also focuses on access and inclusion by all to digital resources and skills, open educational resources and open solutions, developing well-informed long-term policies and strategies to unleash the potentials of ICT to achieve greater quality in education and transform learning, (UNESCO, 2015).

- Second, there was the ***Qingdao statement-2017.***

The main aim of this conference was to lay down strategic priorities and mechanisms for the achievement of the Qingdao declaration of 2015. The Qingdao statement was captured under five headings as follows:

- Priority for equitable access to and use of ICT;
- Policies to unlock ICT for quality and relevance learning;
- Integrated ICT solutions across areas of SDG4 and the SDGs;
- Fostering the evolution of locally sustained ICT solutions for education;
- Coordination mechanisms to strengthen regional and international cooperation.

However, it is important to note that the Qingdao Declaration and Statement constitute the core of international policy documents that directly relates to this study. However, the most relevant question posed by this study is to what extent have these significant policies on ICT in education been institutionalized by educational institutions in Cameroon? This forms the basis for an argument on the need for a strategic ICT policy for secondary education in particular and the Cameroon Education and Training Sector in general.

iv. The African Union's 2063 Agenda

This is a well-developed plan for the transformation of Africa, developed by African Union (AU) in 2013 during its golden jubilee. Captioned as the "*Africa we want*", it constitutes the continent's blueprint to become a global powerhouse in the next 50 years. In its goal number 02, it stresses the need for the use of science, innovation and technology to develop well-skilled citizens. This plan is expected to be achieved through the African Education system.

v. The 2020 - 2030 African Union's Digital Transformation Agenda

On 18 May 2020, the African Union adopted a comprehensive strategy paper on the digital transformation of Africa from 2020 to 2030. The aim of the ten-year plan is to build a single digital market in Africa until 2030. The plan comprises 16 goals, including harmonized legislation, agreements between the AU member states on cyber security and data privacy, interoperability between the African states, extension of the African domain name space, enhancement digital education for everybody (e-Skills Development Programme) and promotion of the Pan-African trade. By 2030, African citizens shall have become enlightened and responsible e-citizens. What is important to note here is that this policy instrument focuses on developing the African digital economy. Through e-skill development, education and training institutions are well informed and prepared to develop the skills required by Africans to integrate into this world class digital economy. The extent to which Cameroon as a member state aligns its teaching-learning to the said policy dynamics will be examined.

More recently, during the 10th African Federation of Teaching Regulatory Authorities (AFTRA) that took place in Windhoek, Namibia from May 9 to 12, 2023, under the theme "Transforming Education in Africa: Teachers, Teaching and the Teaching Profession", ministries of education, National Teaching Councils, Teachers' Unions, Teacher Education Institutions, and international organisations associated with the regulation of teaching made 14 recommendations for quality education in Africa. The 12th recommendation stipulated that member states shall develop *"self-directed learning and Massive Open Online Courses (MOOCs) and teachers' professional development should be promoted in order to use technologies to improve and expand learning for sustainable development",* AFTRA (2023).

vi. The Transforming Education Summit

In September 2022 in New York, the international community reaffirmed digital education as a public good, and agreed to "treat digital technology and virtual environments as core to the educational enterprise". The latter requires the same "rigour, care, and attention that are paid to the

physical infrastructure of learning. Schools and their resources have long been treated as public goods. And rightly so. They benefit everyone and, as such, demand public support, oversight, and governance. The same needs to be done for the digital spaces and infrastructures of learning", UNESCO (2022).

As member state, Cameroon took 13 commitments for the transformation her education system. In that token, the government engaged to "ensure teachers' pre- and in-service training on digital pedagogy, the mastery and use of ICTs in education and distance education management".

1.1.2.2. National Policy Environment

Before delving into the relevant education related technology policy /reforms within the Ministry of Secondary Education, it is important to present a brief summary of the evolution of ICT policy environment as seen below.

i. History on the Evolution of ICT in Secondary Education in Cameroon

The project for introducing ICTs in schools was given an impetus by a presidential statement in 2001. This speech clearly specified "that imported computers and their accessories were to be duty-free for schools. Moreover, the World Bank in its ICT task force policy have raised the concept of cyber education in the global school system to promote the development of computer technology, to improve the accessibility of learners to information technology, and to encourage digital inclusion in developing countries", Béché (2020). As we moved on, consolidating the presidential statement and the World Bank initiative, the Ministry of National Education (MINEDUC) authorised the Inspectorate General of Pedagogy in charge of teaching computer sciences at all levels, to design and develop a project on cyber education in Cameroon. The project was adopted and implemented in April 2001.

In 2004, key strategies on using ICTs in education were highlighted in the first official draft of the Cameroon National Information and Communication Infrastructure (NICI) policy and plan prepared by the government with support from the United Nations Development Programme (UNDP) and the United Nations Economic Commission for Africa (UNECA). In this document, the Cameroonian government recognizes ICTs as a national priority along with education, health, forestry, and governance. As indicated in the NICI plan document, the government resolved to achieve the following:

- Modernizing the educational system through the introduction of ICTs in schools;
- Introducing ICT application training modules into national universities;

- Preparing a sectoral ICT policy for the educational sector;
- Training teachers in the use of ICTs;
- Equipping all schools with ICT facilities;
- Multiplying pedagogic resource centres for teachers and students;
- Establishing distance training facilities;
- Providing support for the production of ICT teaching materials (didacticals).

In June 2005 the Prime Minister signed a decree creating and organizing the national sub-committee for the integration of ICTs in education.

In 2002, a ministerial decision defining the condition for the creation of Multimedia Resource Centres (MRCs) in government secondary schools was published. Then in 2003 a decree introducing ICTs in education was published by the Ministry of National Education (presently MINESEC, the Ministry of Secondary Education). The decree stipulated that ICTs would become a core-course as from September 2003.

The Ministry of Secondary Education was reorganized in 2012 to include a new unit called the National Pedagogy Support Unit (CAAP). CAAP is equipped with a distance training unit called *Unité de Formation à Distance* (UFAD) and is expected to ensure the training and capacity-building for teachers, which includes distance learning. Also worthy of note is that factors influencing the implementation process include budget availability, weak linkages between stakeholders and project management, and coordination. There is no specific board or organ in charge of the coordination of the global cyber education project. Stakeholders seem to be evolving independently, thus resulting in some ignoring what others are doing.

1.1.2.2. National Commitments (Educational Technology-Related Policies/Reforms within the Ministry of Secondary Education)

Prior to 2007, the main education governing framework was Law No. 98/004 of 14 April 1998 to lay down guidelines on Education in Cameroon. At the time of drafting this framework, ICT in education was not a major issue. What was pressing was to lay down a framework for the smooth functioning of primary and secondary education and training in the country. Key issues were the general infrastructure guidelines, curriculum, human resources and finances. This was mostly geared toward increasing the number of Cameroonians in literacy and/or secondary education. Very little reflections were directed to shape policy towards developing skills for the information societies or digital economy as it is the case of today (Akumbu, Teneng and Ngu, 2022).

i. The National ICT Policy

At the wake of 2007, the Cameroon government developed significant interest in ICT and its role in development. This alone precipitated the build-up of a National ICT policy for the development of the nation by the end of 2007. Despite the existence of several initiatives before this period, there was the absence of a particular framework to guide the infusion of ICT in different sectors of the country's development apparatus, including education and training. Key commitments in this policy were to accelerate Cameroon's entry into the information society by encouraging an increase in ICT in every state sector (National ICT Policy, 2007). It suffices to note that Chapter 2 (3) of this document highlights the need to develop the necessary human resources for information society. This chapter stresses that ICT skills shall be developed either in pre-service, in-service, both in formal and non-formal education settings (National ICT Policy, 2007). In this light, the policy mentioned the training of specialists in technical and engineering fields by Higher Education institutions. Also, chapter 2 (5) highlights the mainstreaming of ICT in education and research sector. This means that in real terms, schools at all levels ought to develop the necessary ICT skills for the 21st-century job market. However, it is rather unfortunate that this has never been put into practice. It also follows that this policy made mention of no clear strategic plan to guide the development and use of ICT in the learning environment (Teneng and Ngu, 2021). In this light, Ndenge (2016) explains that the National ICT policy for 2007 made no particular emphasis on the development of ICT in the education sector.

ii. The 2035 Agenda

The 2035 agenda for development in Cameroon also contained some ingredients of ICT in education which, despite its narrow nature was seen as a driver to involve the country into the knowledge-based society. This policy instrument underscored the development of ICT skills required by other sectors for the development of the nation. As a matter of fact, education and training institutions were tasked with the production of skilled tech man power for the transformation of the country into an emerging nation by 2035. Despite this key commitment, Nkamta (2017) argued that policy governance or implementation in Cameroon is stymied as best practices are yet to be felt. This author further states that the main problem of policy in Cameroon is lack or slow implementation and evaluation. In this light, Akumbu, Teneng and Ngu (2022), add that the scattered nature of ICT in education policy in different policy documents is a major default, hindering best practices. These authors are practically worried about the holistic nature of ICT policy for education, which is a key element with policies that transform. In this light, Ndenge (2016) stated that the 2035

vision was another policy milestone for various development sectors in the country, but also failed to make any precise statement for the development of digital skills in the education sector.

iii. The Education and Training Sector Strategy for 2013-2020

Another important policy with regards to this study is the Education and Training Sector Strategy for 2013-2020 (Ministry of Economy, Planning and Regional Development, 2013). This strategic document had as raison d'être to match the cross-education sector to the exigencies of the 21st century. Specifically relevant to this study is specific objective No. 1: "improve the quality of learning in primary and secondary education", (ESSD, 2013: 70). Under this objective, the curriculum reform strategy calls for the generalization of ICT in the whole school curriculum at all education levels. In the same light, strategy No. 4 of this framework focuses on the generalization of ICT in the education/training system. It declares as follows:

The modernization of the education and training system at all levels will be done by integrating and owning ICTs through provision of sufficient digital infrastructure and solid training of all stakeholders. This will involve:

- Building the capacities of teachers and supervisory staff in the use of computer hardware and digital pedagogic resources;
- Promoting new opportunities and training tools (E-learning, distance education, didactic software, etc.);
- Improving the learning environment in schools (multimedia centres, providing schools with computers, etc.);
- Setting up an operational system for preventive and curative maintenance of computers. (ESSD, 2013: 73)

Other ICT-pedagogic integrations aspects like connectivity, and energy supply, were also mentioned in this framework. However, recent studies demonstrated that the Covid-19 pandemic revealed an ill-prepared education system to cope with the new norm as learning switched online. As a matter of fact, Béché (2020) carried out a study to determine the readiness of the Cameroonian education system to respond to covid-19 outbreak, which caused learning to go on-line. Findings revealed that Cameroon education system was significantly below the threshold in the use of ICTs to enhance continued learning in such situations.

In addition to the above, specific objective number 2 insists on "the adaptation of training to the socio-economic environment". As a matter of fact, Ngu and Teneng (2019), emphasizes that every recent education policy should be designed, not only for developing the socio-emotional

personalities of citizens, but to equip them with up-to-date skills required by the 21st century job market. However, it should be noted that any action here was to be based on a study to be carried out on-the-job-market skills to graduate unemployment gap. It therefore suffices to note that this situation is not getting better as both high school and university graduates have in recent years inflated unemployment figures around the country (National Institute of Statistics, 2021).

iv. The Cameroon's Plan for the Digital Economy

In addition to the above, the Cameroon government being aware of the changing trend of the digital economy, drafted and published a framework to guide every sector of the country to get entangled in this new trend. The main issues at the centre of the Cameroon's plan for the Digital Economy constituted the following:

- digital infrastructure: the availability of affordable and quality internet, which is instrumental to bringing more people and businesses online;
- digital platforms: the presence and use of digital platforms that can support greater digital exchange, transactions, and access to public services online;
- digital financial services: the ability to pay, save, borrow, and invest through digital means, which is key to increasing financial inclusion and the e-commerce market;
- digital entrepreneurship: the presence of an ecosystem that supports entrepreneurs, start-ups, and bigger companies to generate new products and services that leverage new technologies and business models, which is critical to widen and deepen digital economic transformation;
- digital skills: the development of a tech-savvy workforce, with both basic and advanced digital skills to support increased technology adoption and innovation and enable investments in high value-added services.

Despite this commendable initiative by the state of Cameroon, a World Bank diagnosis for 2019 pointed out that Cameroon is still lagging in ICT infrastructure, still at the start-up stage for FinTech (Financial Technology). Also, the country lags behind others on two key pillars holding the digital economy: digital platforms and digital skills. As a matter of fact, schools lack interconnected platforms for communication and related administrative functioning. Even the state of e-learning platforms is practically feeble. In this light, Teneng and Ngu (2021) posits that the use of WhatsApp platforms for learning, and National television media during the peak of the covid-19 was a clear demonstration of digital platform gaps in Cameroon's educative system.

On the other hand, limited market relevance of skills development programmes as observed in the school curriculum translates into youth being poorly prepared for the labour market and post-secondary studies. We must also note that the low level of digital skills by school managers and teachers is a significant setback that manifests in outcome by graduates. In all, this policy framework holds critical formulations to push the development of digital skills, but faces same setbacks like those above, that is poor implementation and no detailed technology plan for school. It is based on the weaknesses observed in the above-mentioned policy frameworks that the state of Cameroon adopted the National Development Strategy for 2030 (NDS30), Ministry of Economy, Planning, and Regional Development, 2020.

v. The National Development Strategy 2020 – 2030 (NDS30)

The NDS30 is a strategic document that comes at the heels of multiple challenges faced by the Cameroon economy. These key stakes include revitalizing the economy, improving climate security, strengthening the socio-professional sector, and improving livelihoods. It was adopted within the context of the knowledge-based economy, or information societies. This strategy is an era of dramatic change in every sector, caused by the technology revolution. Consequently, there is a need for various sectors, with education-inclusive goals to adjust to the new dawn. This document expresses the need to improve on the Human Capital Development Initiative (HCDI) through quality education and training at all educational levels. However, a focus on the digitalization of the education remains feeble in terms of a detailed action plan for the education sector. It suffices to mention that this new development policy is less than two years old, and should not be subjected to any harsh criticism since the time lapse is ten years.

vi. The Programme for the Acceleration of the Digital Transformation of Cameroon (PATNUC)

Through Decree No. 2023/224 of 27 April 2023, the President of the Republic authorised the publication in the Official Gazette of the text of Loan Agreement No. 69870-CM for an amount of USD 100 million, or approximately CFAF 50.2 billion, concluded on 23 December 2022 between the Republic of Cameroon and the International Development Association (IDA), to finance the Project to Accelerate Digital Transformation in Cameroon (PATNUC).

The Programme for the Acceleration of the Digital Transformation in Cameroon (PATNUC) is under the supervision of MINPOSTEL and aims to increase digital inclusion and the use of digital agricultural solutions by smallholder farmers in targeted agricultural value chains. Thus, PATNUC embodies the digital transformation approach, targeting a highly strategic sector for Cameroon while

proposing to reform the regulatory framework of the Information and Communication Technology (ICT) Sector to improve the digital skills of citizens and to promote the development of digital applications and services. This Project with its investment in digital connectivity and skills, supports interventions that leverage digital innovations to stimulate agricultural growth, ultimately to improve rural livelihoods.

PATNUC is structured around 4 components: (i) Digital Strategy, Public Policy and Regulation for Digital Inclusion and Transformation, (ii) Digital Connectivity and Inclusion, (iii) Facilitating the implementation of data-driven digital solutions in the agricultural sector; and (iv) Project Management and Citizen Engagement. Thus, the Government, through the National Development Strategy 2020 – 2030, aims to truly initiate the structural transformation of the Cameroonian economy, which will be based on the modernisation of the agricultural sector (agriculture, livestock, fisheries and animal industries) through the improvement of the productivity and competitiveness of family farms and the promotion of a genuine industrialisation dynamic. The modernisation of the agricultural sector will have to be based on the digital ecosystem that is constantly evolving in the country, which is paving the way for the digital economy.

Component 1: The specific objective of this component is to enable the establishment of new institutional, legal and regulatory frameworks conducive to the growth of the digital sector, the enhancement of digital trust, creation of digital platforms and procurement of relevant equipment for the secured and resilient development of digital services in Cameroon.

Component 2: The second component shall focus on stimulating the local market by facilitating access to the internet and the integrative use of ICTs into the economic development fabric of the country. Its specific objective is to promote the expansion of digital networks into rural areas focusing on less-served localities mainly through Public-Private-Partnerships (PPP) with the view of enhancing mobile broadband offerings in these localities. This component will also enhance “last mile" connectivity to key public entities such as hospitals, schools, local government offices, etc. This component will also look at supply-side interventions such as the purchase of international bandwidth, the acquisition of digital equipment and targeted training for key public entities.

Component 3: The third component will focus on the strengthening of the Disruptive Agricultural Technologies (DAT) for agricultural transformation by scaling the development of DAT solutions to enhance market links and added-value creation through increased use of DAT solutions by targeted rural communities. The component also seeks to strengthen public DAT innovation ecosystems and digital capacity building in rural areas.

As part of the environmental and social safeguarding documentation required to support the loan application, an Indigenous Peoples Planning Framework (IPPF) covering the implementation phases of the project is required.

vii. Law No. 2023/009 of 25 July 2023 to Institute the Charter on Child Online Protection in Cameroon

This law applies to all activities involving children in the cyberspace. In the course of its implementation, the Ministry in charge of telecommunications shall draw up, in collaboration with other sectoral administrations, a National Action Plan on Child Online Protection that aims to ensure secure access to the internet by the child for his/her learning, development and fulfilment. Also, it defines the role of public authorities and the private sector as well as the responsibilities of cyberspace actors.

The ministries in charge of education, in synergy with the ministry in charge of telecommunications are called upon to draw up training curricula on the responsible use of internet and social media, with a focus on child online protection.

a. Legal and regulatory Framework of Cameroon Digital Policy

Two years ago, the Cameroon government decided to liberalise the audio-visual sector and, accordingly, enacted a number of legal instruments governing broadcasting. This was all the more necessary since "the legal framework in force then had to be reformed to take account of the shift from a situation of monopoly to that of competition as concerns radio and television broadcasting. CRTV was the sole broadcaster in Cameroon, but private audio-visual broadcasting was authorised by Law No. 90/52 of 19 December 1990 as amended by Law No. 96/4 of 4 January 1996. However, it is only recently that private audio-visual operators have been able to avail themselves of that law, thanks to the issue of Decree No. 2000/158 of 3 April 2000 to implement the said law". This gave rise to an abrupt increase in applications for authorisation to set up radio and television stations.

The arsenal of instruments governing the telecommunications sector includes:

- Law No. 98/14 of 14 July 1998 to govern telecommunications in Cameroon;
- Decree No. 98/198 of 8 September 1998 to set up the Cameroon Telecommunications Corporation (CAMTEL);
- Decree No. 2001/830/PM of 19 September 2001 to lay down modalities for the operation of telecommunications networks;

- Decree No. 2001/831/PM of 19 September 2001 to lay down modalities for the provision of telecommunications services;
- Law No. 2001/10 of 23 July 2001 to institute minimum service in the telecommunications sector;
- Law No. 2005/13 of 29 December 2005 to amend and supplement some provisions of Law No. 98/14 of 14 July 1998 to govern telecommunications in Cameroon;
- Law on competition on internal markets in 1998 (NA_CIM, 1998)
- Law on the prescription of minimum services in the communication sector in 2001 (NA_MSC, 2001).

  Since 2010, many other bills have been passed to prepare a favourable, legal and regulatory environment for the modernized economy.
- 2010 Law relating to electronic communication (NA_EC, 2010);
- 2010 Law relating to electronic commerce (NA_EC, 2010);
- 2010 Law relating to the cyber security and the cyber criminality in Cameroon (NA_CSCC, 2010);
- 2011 Law on consumer protection (NA_CP, 2011);
- Decree No. 2023/224 of 27 April 2023 to authorise the publication in the Official Gazette the text of Loan Agreement No. 69870-CM for an amount of USD 100 million, or approximately CFAF 50.2 billion, concluded on 23 December 2022 between the Republic of Cameroon and the International Development Association (IDA), to finance the Project to Accelerate Digital Transformation in Cameroon;
- Law No. 2023/009 of 25 July 2023 to Institute the Charter on Child Online Protection in Cameroon

So far, the laws regulating the Internet sector in Cameroon are still in preparation.

An analysis of the weaknesses in the legal instruments in force shows that the current legal and regulatory framework governing the audio-visual and telecommunications sector has a number of shortcomings; and thus, needs to be improved. For example, the main law regulating telecommunications in Cameroon (Law No. 98/14 of 14 July 1998) makes no reference to mobile telephone services, internet access, etc. Moreover, the too many instruments which currently exist may lead to confusion and uncertainty.

Concerning business, there is no appropriate legal framework to regulate the use of ICTs for business. A business environment governed by appropriate laws and regulations should aim at creating competition through adequate incentives for investment and innovation in ICTs, in a bid to

improve access to services as well as service quality. It should be able to attract foreign investors, and keep away those who may obstruct local initiatives or undermine consumer rights. The current law governing competition (Law No. 98/13 of 14 July 1998) should be amended to take account of ICTs. An ICT law could even be envisaged to foster fair competition and ban some business practices such as the misuse of the dominant position.

Appropriate laws could further be enacted to better protect intellectual property (copyright, patents, registered trademarks and other industrial works), protect and secure data, punish computer and cybernetic offences, and enable free access to information. An appropriate legal framework is indispensable to deter the infringement of intellectual property rights in the ICT domain. Such laws should aim not only to protect investments, but also to encourage creativity as well as the digitalisation of folklore, arts and music and even to protect the owners of such works.

The absence of legislation on e-trade or on electronic data interchange (EDI) and related issues is a major handicap. Such legislation should be able to establish the legal recognition of an electronic signature and to provide answers to pending questions concerning online transactions (the legality of contracts or transactions concluded on the Web, for example).

It should be acknowledged that there is no harmonised legal framework for ICT regulation in the CEMAC sub region. OHADA and similar institutions ought to incorporate such a framework in their laws in force.

b. Institutional Framework of Telecommunications and ICTs

A number of institutions are involved in the control and development of ICTs in Cameroon. The government has general oversight of the development and control process, but there are also dedicated institutions.

The Presidency of the Republic plays a determinant role since it defines and lays down guidelines for the national ICT policy. The Head of State is conscious of the vital role this sector plays in Cameroon's economic development, good governance and poverty reduction. The importance attached by the President of the Republic to this sector is evidenced by the fact that NAICT – the institution directly responsible for laying down guidelines and regulations for the ICT sector in Cameroon – is placed under the technical supervision of the Presidency of the Republic.

The Prime Ministers' Office is responsible for monitoring, that is, ensuring that the national ICT policy is effectively implemented.

The National Assembly also plays a key role in national policy implementation. Its role is mainly legislative, since it is responsible for voting ICT related laws. This role is all the more relevant since one of the duties of the National Assembly as a legislative body is to control general government action.

Telecommunications and IT-based businesses are today's most dynamic and fast-growing sectors in the world economy. Unfortunately, Cameroon is not yet part of the Connectivity scorecard, a global ICT index that ranks 52 countries not only on their deployment of ICT infrastructure but also the extent to which governments, businesses and consumers make use of connectivity technologies to enhance social and economic prosperity, also called useful connectivity. This is based on the fact that most Cameroonian businesses are not online. In Africa, Ghana is the latest entrant to the Connectivity Scorecard. Ghana ranks 21st, with an overall score of 2.88, amongst its peer group of 26 resources and efficiency-driven economies, as defined by the World Economic Forum, Baller et al., (2016). Ghana came ahead of Morocco and just behind Indonesia. At present, and after some measures put in place to develop the sector, especially setting up legal and regulatory telecommunication frameworks governing telecommunications in Cameroon, such as: (1) the liberalization of the sector, (2) the separation of postal activities from those of telecom and ICTs, (3) the new missions reassigned to the Minister of Posts and Telecommunications, and (4) the setting up of independent and autonomous monitoring, development and regulatory organs, there is a slight increase in the access to telecom services and ICTs, Atsa et al. (2016).

Table 3: Government Strategic and Regulatory Missions for the Digital Economy (Atsa et al., 2016)

Organism	Strategic and regulation Missions	Date of Creation
Ministry of Posts and Telecommunications (MINPOSTEL)	• Development and implementation of Government policy of Telecommunication and ICT • ICT Infrastructure • Coordination • Policies	1958
National Agency for Information and Communication Technology (ANTIC)	• Promote and monitor government actions • Regulating electronic security activities. • Certification (Application and specification of ICT tools	2002
National Centre for Development of Computer Science (CENADI)	• Advisory • Tools support • Technology adoption, development and deployment	1988
Telecommunication Regulatory Board (ART)	• Legislation • Regulation • Monitoring of activities for telecommunication operators and users, • Assets allocation	1998

Table 3 presents a summary of the main public organs regulating the telecommunications and ICT industries in Cameroon. Table 4 gives the information about fixed and mobile phone and Internet subscribers. According to the Cameroon Telecommunication Regulatory Agency, the rate of mobile penetration in Cameroon is around 71%.

Telephone users in general increased from about 2 million in 2005 to over 10 million by 2010 and to more than 17 million in 2015.

The information provided in table 3 reveals a number of findings:

- the mobile phone is the preferred choice of telephony and internet consumption;
- Cameroonians are more and more connected on the internet since 2014;

- the number of subscribers of mobile phones seems to stagnate since 2014;
- there is a steady growth in the internet traffic and in the number of users.

Table 4: Statistical Data on Telecommunications (MINPOSTEL, 2015)

Number of Subscribers	2012	2013	2014	2015
Fixed Telephone	379,131	347,921	248,964	412,415
Mobile Telephone	13,108,058	14,841,311	16,683,565	16,806,894
Total Telephone	**13,487,189**	**15,189,232**	**16,932,529**	**17,219,309**
Fixed Internet	137,306	397,284	336,407	-
Mobile Internet	6,498	6,082	4,233,927	6,526,872
Total Internet	**143,804**	**403,366**	**4,570,334**	**6,526,872**

In addition, "the internet through ADSL often causes usage and exploitation difficulties to consumers; the above information also indicates that at the present stage, Cameroon is not fully connected. The following table shows an inventory of downstream production or offers of products and services of the country related to Internet ICT", Atsa et al (2016).

Table 5: Inventory of Downstream Production or Offer of Products and Services (Atsa et al., 2016)

On-Demand Service	Service User	Stakeholders	Current Situation
Basic Services (voice, telephone, fax, roaming, data, prepaid)	-Big accounts -Professionals -Residential customers	CAMTEL MTN ORANGE NEXTTEL	Availability of access. Gradual coverage of the territory Professionals and residential customers of high standing start to have the culture of Data
Value-added Services MMS, Mobile banking, car tracking, Internet, WAP, GSM gateway	-Professional -Residential customers of high standing	MTN ORANGE NEXTTEL	Available only for GSM gateway

Infrastructures	-Operators -Service providers -Customers	CAMTEL MTN ORANGE NEXTTEL	Insufficient/lack of transmission capacity to cover certain contractual regions Most transmission and switching equipment 2nd or 3rd generation
INTERNET Narrowband, voice over IP Broadband	Big accounts -Professionals -Residential customers	CAMTEL MTN ORANGE NEXTTEL	CAMTEL access obsolete equipment are gradually renovated/ others 3G and towards 4G
Data Transmission	Big accounts professionals	CAMTEL ISP	3G speed

Therefore, the government has taken a certain number of actions, notably to increase the number of mobile phone operators to reduce the costs of communication and facilitate Internet access. Among others, these actions are: the establishment of a platform for securing electronic transactions based on public key infrastructures; and the deployment of optical fibre throughout the territory. This on-going project covers a distance of more than 6,000 km. According to the government report, (CC_PRC, 2016), this new network will be expanded to 10,000 km by 2020.

As illustrated in graph 3, the deployment of the national backbone network (NBN) project with optic fibre throughout the territory and beyond borders will link and cover Cameroon cities with broadband connections. This project aims to help operators provide telecommunication broadband services such as IPTV, SDandHD, VoIP, etc. to businesses, enterprises and residential users in Cameroon with affordable costs. This project which is being finalized will also include:

- ✓ Construction several sub-marine cables (SMC-NBN);
- ✓ Establishment of urban video surveillance in Yaoundé and other major cities close to borders (VS-NBN);
- ✓ Local Access network (LAN-NBN) increases the bandwidth of residential users and small enterprises with broadband Internet access.

Graph 3: Optic Fibre Deployment (MINPOSTEL, 2015)

Table 6 shows in quality and quantity the contents of this project, in terms of future internet and ICT services provided to enterprises and users nationwide.

Table 6: Contents of the NBN project (Atsa et al., 2016)

	Designation and References	Quantity
	MSAN/OLT	293 (covering 43 localities)
Details of Expected Capacities	ADSL/COMBO	157,285
	FTTX ACCESS	46,592
	GE ports for Enterprises	960
	FE ports for Enterprises	528
	E1 ports for enterprises	688
Distribution	Underground Network	60Km
	Aerial Network	250Km
	Optic PC (FAT)	4900 with 1300 direct line

When completed, all these projects shall place the country as the Hub of telecommunications and e-businesses in the sub-region. They will lead to the development of another form of ICT-based transactions such as electronic payment and e-commerce. Consistently, a new form of employees has emerged like the airtime vendors (generally referred to as call boxers) who make up a population of almost 100,000 people that is about half the size of human capital for public service. New training niches have also emerged in universities with the creation of new specialized majors to provide Cameroon with highly qualified human resources in the field of ICT. Notwithstanding these strategic orientations of the government, actions are expected to sustain the laudable action already engaged. It will be about strengthening the supply electric current, decreasing costs of communication and Internet access, facing new challenges related to the right of labour and social protection, and finding the mechanism to finance entrepreneurial initiatives. Moreover, the simplification of procedures must be strengthened to enable the creation of businesses based on ICT. It is crucial that the government finds ways to regulate the economy in order to provide better benefits in terms of employment.

Table 7: Comparative Investment in ICTs (Atsa et al., 2016)

	Cameroon	Senegal	Cote d'Ivoire	Kenya
% GDP	3.4%	6%	5.7%	4.2%
Investment (ICT) (Billion CFA)	700	1,200	1,000	2,000
Income (State) (Billion CFA)	195	250	300	1,500
Direct Jobs	6,000	5,000	6,000	20,000
Indirect Jobs	500,000	200,000	180,000	800,000

Table 8: Distribution of Telecentres and Digital Centres in Cameroon (Atsa et al., 2016)

Region	Telecentres	Digital Access Points	Digital Agricultural Centre
Adamawa	11	03	/
Centre	28	05	/
East	15	06	/
Far-North	20	08	/
Littoral	14	05	/
North	13	06	/
North West	10	07	/
West	21	03	/
South	29	06	02
South West	16	03	/
Total	177	52	**02**
Overall	**231**		

c. ICT Education in the Ministry of Secondary Education

The project for introducing ICTs in schools was given an impetus by two presidential statements in 2001, which brought ICTs into the realm of education at all levels of schooling. "These statements made it clear that imported computers and their accessories were to be duty free for schools. Moreover, the World Bank in its ICT task force policy has raised the concept of cyber education in the global school system to promote the development of computer technology, to improve the accessibility of learners to information technology, and to encourage digital inclusion in developing countries.

Consolidating the presidential statement and the World Bank initiative, the Ministry of National Education (MINEDUC) authorised the Inspectorate General of Pedagogy in charge of

teaching computer sciences at all levels to design and develop a project on cyber education in Cameroon. The project was implemented in April 2001.

In 2004, key strategies on using ICTs in education were highlighted in the first official draft b of the Cameroon National Information and Communication Infrastructure (NICI) policy and plan prepared by the government with support from the United Nations Development Programme (UNDP) and the United Nations Economic Commission for Africa (UNECA). In this document, the Cameroonian government recognises ICTs as a national priority along with education, health, forestry, and governance. As indicated in the NICI plan document, the government has resolved to achieve the following:

- Modernising the educational system through the introduction of ICTs in schools;
- Introducing ICT application training modules into national universities;
- Preparing a sectoral ICT policy for the educational sector;
- Training teachers in the use of ICTs;
- Equipping all schools with ICT facilities;
- Multiplying pedagogic resource centres for teachers and students;
- Establishing distance training facilities;
- Providing support for the production of ICT teaching materials (didacticals).

In June 2005 the Prime Minister signed a decree creating and organising the national sub-committee for the integration of ICTs in education.

Policy Implementation

The projects are implemented in collaboration with external partners and with support from the president of the country. The implementation phase started in 2001 and, since then, the government has signed a number of decrees to pave the way for the introduction of ICTs in education.

In 2002 a ministerial decision defining the condition for "the creation of Multimedia Resource Centres (MRCs) in government secondary schools was published. Then in 2003 a decree introducing ICTs in education was published by the Ministry of National Education (presently MINESEC, the Ministry of Secondary Education). The decree made it clear that ICTs would become an obligatory discipline beginning in September 2003", Teneng and Ngu (2020).

The Ministry of Secondary Education was reorganised to include a new unit called the National Pedagogy Support Unit (CAAP). CAAP is equipped with a distance training unit called

Unité de Formation à Distance (UFAD) and is expected to ensure the training and capacity-building for teachers, which includes distance learning.

Factors influencing the implementation process include budget availability, weak linkages between stakeholders and project management, and coordination. There is no specific board or organ in charge of the co-ordination of the global cyber education project. Stakeholders seem to be evolving independently, thus resulting in some ignoring what others are doing.

1.1.3. Distribution of ICT Tools per Students and per Teachers in the Ministry of Secondary Education

The students-computer ratio x-rays the teaching-learning conditions within the computer classroom. In 2018/2019, there were 51 students for 1 computer. It was higher in SGE (54) than in TVT (39). Between 2016/2017 and 2018/2019, it has remained stable. At the regional level, the decrease of student enrolment in the North-West and South-West has reduced the ratio at the national scale. In the northern regions, the ratio is particularly high. In the Far-North, it is 3 times the national average.

Table 9: Evolution of students-computer ratio in government secondary schools per region from 2016/2017 to 2018/2019 (MINESEC, 2022)

REGION	2016/2017			2017/2018			2018/2019		
	SGE +TVT	SGE	TVT	SGE + TVT	SGE	TVT	SGE + TVT	SGE	TVT
Adamawa	51	56	35	63	76	34	72	77	52
Centre	45	48	37	47	48	23	46	49	37
East	41	43	36	53	53	50	50	48	55
Far North	126	143	59	131	147	67	156	178	83
Littoral	45	47	36	46	52	15	42	45	30
North	91	108	51	104	117	68	123	133	90
North-West	64	68	55	44	52	13	10	13	6
West	36	37	35	44	45	30	42	42	44
South	37	39	33	41	44	28	40	41	36
South-West	47	49	38	24	22	16	24	27	16
National	**51/1**	**54/1**	**40/1**	**52/1**	**56/1**	**25/1**	**51/1**	**54/1**	**39/1**

Table 10 hereinafter presents the students-computer ratio in the Ministry of Secondary Education. Here, it is obvious that the said ratio is poor in the Far-North, North and Adamawa regions

with 102, 80 and 57 students per computer respectively. Whereas the North-West and the littoral have better ratios with 12 and 27 students per computer respectively.

Table 10: Students/Computer ratio in SGE and TVE (MINESEC, 2022)

Students/Computer ratio			
Regions	**Number of computers**	**Number of students**	**Students/Computer ratio**
Adamawa	1,416	80,106	**57/1**
Centre	18,545	506,055	**27/1**
East	1,976	89,750	**45/1**
Far North	2,120	215,525	**102/1**
Littoral	14,893	400,769	**27/1**
North	1,824	145,339	**80/1**
North-West	4,941	60,830	**12/1**
West	8,890	308,753	**35/1**
South	2,104	82,446	**39/1**
South-West	2,670	93,806	**35/1**
National	**59,379**	**1,983,379**	**33/1**

Table 11 bellow presents the teacher-computer ratio in the Ministry of Secondary Education. Here, it is obvious that the said ratio is very low with 6 teachers for 1 computer at the national level. This nation tendency hides regional and divisional disparities. The Littoral, Centre and West regions have better ratios with 3, 5 and 6 teachers for 1 computer respectively. However, the South-West (14/1), the Far-North (12/1) and the East region (10/1) have very low ratios.

Table 11: Teachers/Computer ratio in SGE and TVE (MINESEC, 2022)

Teachers / Computer ratio			
Regions	**Number of computers**	**Number of teachers**	**Teachers/Computer ratio**
Adamawa	372	3,585	**10/1**
Centre	4,012	19,342	**5/1**
East	415	3,944	**10/1**
Far North	596	7,194	**12/1**
Littoral	2,943	9,586	**3/1**
North	524	4,983	**10/1**
North-West	758	7,682	**10/1**
West	1,762	10,253	**6/1**
South	530	4,633	**9/1**
South-West	469	6,353	**14/1**
Cameroon	12,381	77,555	**6/1**

The Multimedia Resource Centres

The School-Multimedia Resource Centre ratio increased from 0.02 in 2016/2017 to 0.05 in 2018/2019 in SGE in Cameroon. This indicator shows that few schools have Multimedia Resource Centres at the national level despite the increase. The Littoral region has the highest number of Multimedia Resource Centres with a 0.11 ratio while the Centre, Far-North and West are below the national average.

Table 12: Distribution of Multimedia Resource Centres per region (MINESEC, 2022)

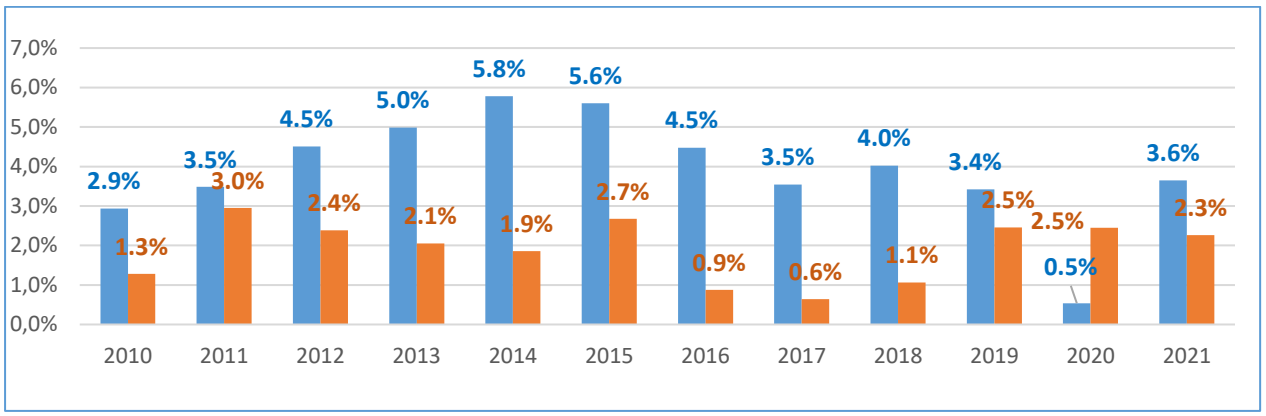
Region	Number of Multimedia Resource Centres
Adamawa	10
Centre	24
East	09
Far North	11
Littoral	22
North	08
North-West	16
West	20
South	13
South-West	18
National	**151**

1.1.4. Cameroon Macro-Economic Context: A Bird's Eye View

The economy of Cameroon represents 45 % of the GDP of CEMAC in 2021 (IMF), it has a diversified structure with 52% of value added in the tertiary sector. It however remains dependent on less processed export of raw materials (crude oil, logs and sawn timber, cocoa, liquefied natural gas, cotton, raw aluminium), and the trade balance appears structurally in a deficit.

During the 2010 decade, the economy of Cameroon portrayed an economic growth that was positive and higher than that of population growth; the GDP per capita thus increased to 15% at constant rates between 2010 and 2022. It rather resisted well to the crisis of commodity prices which occurred in 2014 than other Central African countries.

Graph 4: Evolution of GDP (economic growth) and inflation rate (consumer price) (IMF, World Economic Outlook, October 2022)



The Covid-19 pandemic had a less important impact in Cameroon than what would have been anticipated. The country would have registered a slight growth of about 0.5 % in 2020, supported by a good cotton season, and a dynamic PBW driven by private demand. Cameroon's economic activity continued its increase in 2021, with a GDP growth rate estimated at 3.6 %. The price evolution remained under control all along the period and was evaluated at 2.3% in 2021.

A crisis marked by inflationary risks linked to the post-Covid-19 recovery and the war in Ukraine. After the recession registered in 2020 as a result of the COVID-19 pandemic, the global economy embarked on a relative recovery in 2021, with a growth estimated by the IMF at 6.1% as against -3.1% in 2020. The disruption of the supply chains and energy price increases that resulted therefrom were worsened by the Russo-Ukrainian war. Macro-economic prospects darkened and concerns on the control of inflation came to the forefront of agendas in the face of the boom of commodity prices and generalisation of pressures to increase prices, notably those of foodstuffs. Growth estimates for 2022 and 2023 were revised downwards to +3.6% (IMF)

In the CEMAC zone, economies were back on the path of growth in 2021, with a rate estimated by BEAC at 1.9%, as against -1.7% in 2020 and a growth rate of +3.3% is estimated for 2022.

In 2022, the growth of Cameroon's economy should settle at 4% as against 4.2% initially projected. The final consumption of households which represents 70% of the GDP would increase on average by 5.2% with a contribution to economic growth of 3.8 points. The growth in investment would be more vigorous, with a rate of 6.7%. The increase of world prices of foodstuffs, energy and agricultural and industrial inputs blamed on the war in Ukraine should however accentuate the country's inflationary pressures. According to the latest IMF forecast, inflation could exceed the

community standard of 3% and rise to 4.6 % in 2022, as against 2.3 % in 2021, before dropping back to around 2% in the mid-term. The 2023 bud get is based on an inflation rate of 3%.

Table 13: Cameroon key macro-economic indicators over the 2022-2025 period (Alignment Committee in the MTBF)

	2022	2023	2024	2025
Nominal GDP (in billions)	27 489	29 120	31 006	33 770
Growth rate (%)	3.7	4.2	4.9	7.9
Non-oil growth rate (%)	3.8	4.5	5.2	5.7
GDP deflator (%)	5.5	1.7	1.5	1.0
Non-oil GDP deflator (%)	4.2	2.3	1.7	1.5
Inflation (%)	4.6	3.0	3.0	2.5
Oil production (in millions of barrels)	25.0	26.0	22.1	24.5
Gas production (in billions of CFA F)	79.7	88.0	93.0	256.0
World price of the barrel of oil (US $)	98.2	85.5	80.2	76.2
LNG prices	12.0	10.0	10.0	10.0
Exchange rate US$/CFAF	620.6	640.0	638.3	634.5

Uncertain mid-term prospects. Macro-economic prospects remain more uncertain and dependent on uncertainties inherent to the duration of the Russo-Ukrainian conflict and expected impact of measures for economic recovery taken by Government. Prospects are regularly re-evaluated, growth expected for 2023 stands at 4.6% at the moment when the budget orientation debate was reviewed to stand at 4.2% for the final preparation of the budget.

Macro-economic projections carried out under the hypothesis of a gradual return of the economy on the path of growth before the Covid-19 pandemic. The growth of economic activity should stand at 5% on average over the 2023-2025 period, supported by the consumption of households and investment. Domestic demand should benefit from the spin-off effects of recovery measures of economic activity prescribed by Government, the resumption of investment (public and private), and renewed dynamism of the labour market. Between 2023 and 2025, the final consumption of households which represents 70% of GDP would on average gradually increase by 5.2% with a contribution to economic growth of 3.8 points. The growth in investment would be more vigorous, with an average of 6.7%8.

1.1.4.1. Outlook and Risks

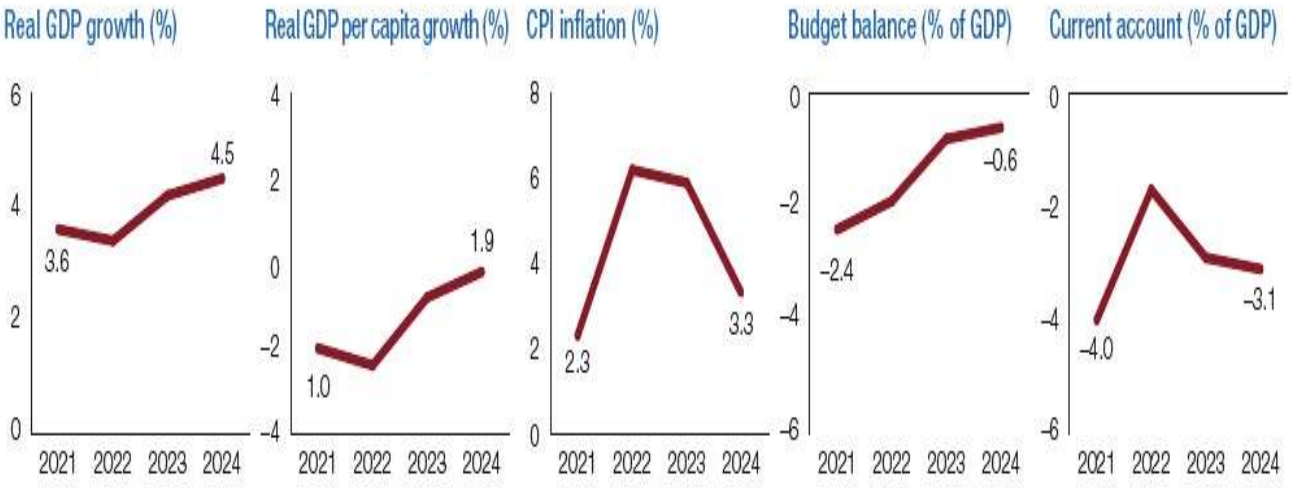
The real GDP is projected to grow from 4.2% to 4.5% respectively in 2023 and 2024 thanks to the gradual improvement in the international economic context and higher national gas production and global commodity prices. “Inflation is projected to decline gradually, to 5.9% in 2023 and 3.3%

in 2024, thanks to continued tightening of monetary policy by the Bank of Central African States. The budget deficit is forecasted to further narrow to 0.8% of GDP in 2023 and 0.6% in 2024, though the current account deficit is projected to widen to 2.9% of GDP in 2023 and 3.1% in 2024, respectively. “Public debt is projected to reach 45.8% of GDP in 2023”. Possible headwinds include the effects of geopolitical tensions (notably Russia’s invasion of Ukraine, which has increased uncertainty around supply chains, most especially in the energy sector.

1.1.4.2. Climate Change issues and Policy Options

The private sector’s “contribution to green growth finance is vital. An estimated $57.6 billion in climate finance is needed to achieve the objectives set for 2030. But over 2015–20, Cameroon mobilized only $162.4 million a year as part of its commitments under the Paris Agreement. Of the $380 million committed to climate finance, only 3% is from the private sector”, AU (2022). In that token, the sector’s participation is one of the main challenges to implementing climate actions through climate finance instruments, such as green bonds and green climate funds. Cameroon would take advantage of its substantial natural capital to finance green growth. Reducing illicit trade and flows linked to the exploitation of natural resources as well as improved management could lead to higher revenue to finance green growth.

Graph 5: Cameroon GDP growth from 2021 to 2024 (African Economic Outlook, 2023)



Source: Data are as of April 2023 and are from domestic authorities; figures for 2022 are estimates and figures for 2023 and 2024 are projections by the African Economic Outlook team.

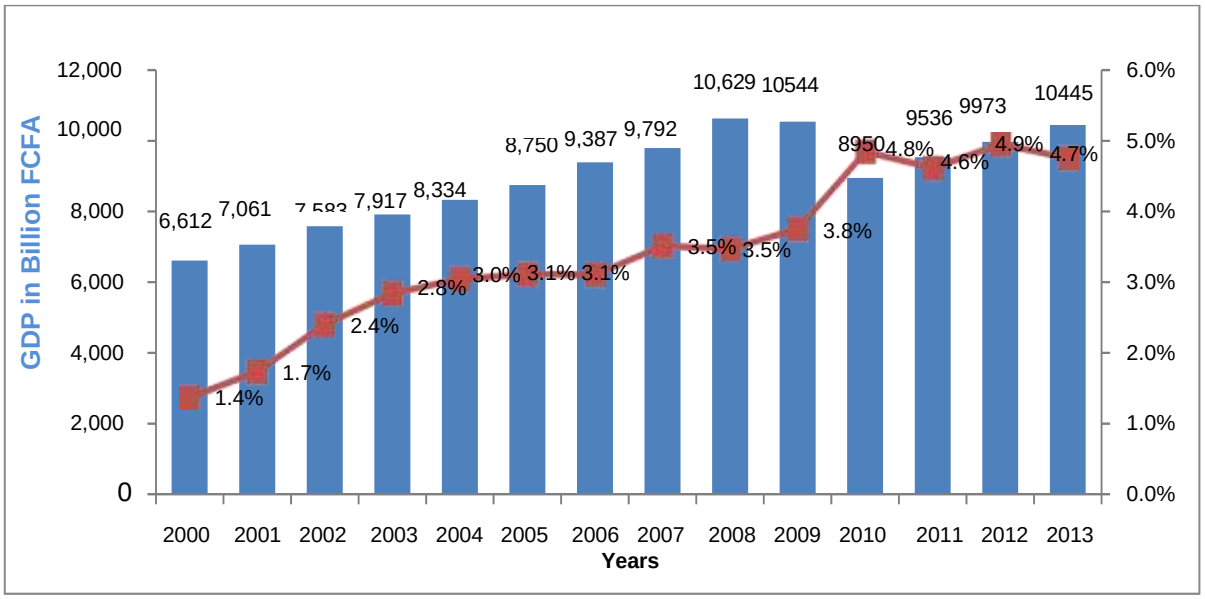
1.1.5. The State of Digital Economy in Cameroon

From 2015, the government of Cameroon has challenged stakeholders nationwide to move toward a network economy also referred to as the digital economy aiming to build up the country’s development. This governmental ambition has been a source of many discourses directed to a myriad of visions on what is supposed to be done for the implementation of this new economy. Various

structures are mainly involved in this project in conformity with government organisation, which recognises certain attributions to each and every public or private institution. But they lack a clear vision of what are the prerequisites for such endeavour. Hence, without a clear roadmap, time and resources would be wasted, while other states with a clear roadmap coupled to a vision would make a difference and leapfrog in growth and development (Atsa et al., 2016).

In that token, Cameroon government has pledged to modernise its economy through its journey of becoming an emerging country by the year 2035. On that purpose, the Growth and Employment Strategy Paper (GESP) 2010 – 2020 approved by the national assembly, explains how the country intends to make of ICTs the main engine of its development and play its role as a hub in the Central Africa sub-region. Several discourses based on economy, if not all by the Head of State and government officials, have been constituted by an overwhelming emphasis on the digital economy. In that perspective, couple of measures and projects related to the implementation of such economy have been carried out in all sectors of economic activity, and many others are in perspectives to reflect the visible determination of the government commitment to this ambition.

Graph 6: Contribution of Digital Economy to the Cameroon National Economy (Atsa et al., 2016)



1.1.5. Digital Business Transformation

According to Atsa et al. 2016, "the digital business transformation involves the upgrading and the appropriation of new digital assets that refer not only to data, new payment methods and distribution, access to network, dematerialization, the connected objects and 3D printing, but also the skills and expertise of the organization. It also calls for the deployment of an experimental culture, promoting and rewarding innovative attitudes and practices". Deloitte and Telstra (2012)

highlighted four characteristics that a company must have to cope with technological changes arising from the digital economy: “awareness, corporate culture, agility organizational and effective resources”. It follows that companies incorporating these new digital assets will benefit from increased productivity and can deal more effectively with global competition.

A good number of Cameroonian companies have “little or no preparation to deal with future disruptions resulting from the digital economy. Recall that advanced manufacturing is a new means of production, an organization mode that is to develop intelligent plants that can better adapt their production to customer needs (product customization) and to be more efficient in resource and raw materials procurement. It is based in particular on new technologies such as the Internet of Things, Internet of Data and Services (big data, cloud computing, etc.) and connectivity between software and production equipment”, Lemoine (2014). For product customization, customer knowledge has become a major asset for companies. These have at their disposal two main levers to take advantage. In this case, they optimize the collection of large data using customer relationship management smart tools and sensors (which indicate the use of products by customers, consumption patterns, etc.). They can then make intelligent use of these large data and analysis to optimize customer relationships. One can ask the following question for instance: How does Cameroon deal with advanced manufacturing? Currently, “several European countries, including France, Germany and Belgium, are developing public policies for organizations to increase their productivity and, incidentally, their competitiveness. The government of Cameroon should follow this approach from European countries”. In particular, Cameroon should strengthen the presence of players by promoting advanced manufacturing.

The availability of various funding and support tools for companies wishing to “undertake this shift should also be considered by the Government. However, there is a number of challenges that need to be taken into account. These include the business investment in machinery and equipment, including ICT; the size of the internal market, encouraging exports for return on investment; knowledge and understanding of the manufacturing of advanced concept in business; data security in a context of connected plants; and the level of employees' digital skills”. The intensification of use, upgrade and appropriation of new digital assets desired for Cameroonian companies is the main issue regarding the advanced manufacturing.

1.1.5.1. E-commerce

Another digital business transformation comes from “electronic commerce (Palacios, 2003). With an average annual growth rate estimated at 13.8% between 2013 and 2018, e-commerce remains a trend in the world, which Cameroonian companies will have to adjust (EMarketer, 2014).

It is estimated that Cameroonian adults purchased goods to the value of several hundred million CFA francs in 2014", Bahri-Domon (2015). However, it is regrettable that "less than 1% of Cameroonian companies in the sectors of manufacturing, wholesale trade and retail services sell products and services online. Correspondingly, over 90% of purchases made online by Cameroonian consumers were made on foreign websites, and thus constitutes missed opportunities for Cameroon companies". Nevertheless, it is interesting to note there is a good level of Internet use by Cameroonians, including for shopping online; and there are more and more players in Cameroon who are working to promote electronic commerce.

Moreover, many local technological solutions "are continuously being developed in Cameroon. However, Cameroon faces several challenges related to e-commerce. These include: the strategic planning and review of business processes, including business logistics; the development of new business models, for the development of online business; the integration of technologies by companies; the training of manpower in internal and specialized candidates; the competitiveness and the increased presence of Cameroonian companies on the local and regional markets". Last but not the least, the collection of sales tax on online transactions conducted with companies outside of Cameroon is another challenge to address". The main issue for e-commerce is its adoption and exploitation to its full potential by Cameroonian companies and people.

1.1.5.2. ICT Sector

The interest in ICT highlights companies engaged in "the manufacturing of telecommunications equipment, instrumentation, software publishing, and computer and telecommunication services. This sector deploys infrastructure and business solutions to support the activities of companies in other sectors and the transition to a green economy which is more efficient in the management of its resources", Atsa et al (2016). ICT companies are best positioned both to participate in the digital economy innovation effort, thereby promoting productivity growth and competitiveness of other sectors, and to implement in their activities new technologies that will be developed. ICT is strategic for the economy of Cameroon because it "will be a great source of income in the following three categories: IT services industry, telecommunications, and software development. Cameroon should strengthen an extensive ecosystem involving leading companies, competitive tax credits intended specifically for companies in the ICT sector, the availability of electricity at low cost and low carbon footprint for energy-intensive businesses such as data centres, and the recognized expertise in ICT goods, both in innovative product development and in manufacturing. Some challenges related to ICT are the following: the marketing of products and services of the Cameroonian ICT sector; the development of the industry based on the growth of SMEs and establishing better links between SMEs and large companies; a sufficiently united and

structured ecosystem; the retention of talents given the mobility of the workforce specialized in ICT; and the development of strategic projects contributing to innovation in the ICT sector". Increasing competitiveness of ICT companies is the main issue for this category.

1.1.5.3. Workforce

As far as the workforce category is concerned, the effect of ICT is important not only for "the acquisition of basic knowledge in today's economy, but also for the development of new skills essential for employment. That is why many states considered digital skills, including those in ICT" (Britton and McGonegal, 2007), as a key component of their digital economy policies or strategies. Cameroon can obviously not escape this trend. There are two aspects about work: the availability of a skilled workforce in the digital economy and the development of digital skills of all workers and managers, including through digital tools. In the context of Cameroon, successful workforce can be implemented through a quality and internationally recognized education system, "especially at the post-secondary level, and an ecosystem of active training, which can improve the diversity of its offer. The following challenges should therefore be addressed: the availability of a sufficiently specialized workforce; the number and sufficient quality of graduates in fields related to digital; and the digital skills at primary schools. For this last challenge, it is reported that the United Kingdom has already integrated the teaching of computer science from the primary level. Other countries, including Finland, Estonia and South Korea plan to do so shortly.

Another challenge is having training programmes and educational institutions that fit quickly to changes in the labour market, as the "Cameroonian universities and secondary schools do not offer enough training programmes on technological knowledge and management of new digital assets. Finally, the attraction and retention of highly skilled workforce is also of great importance. The main issue here is related to the adequacy of skills of the workforce and the balance between these skills and the businesses needs in the context of digital switchover" Atsa et al (2016).

1.1.5.4. Digital Infrastructures

The deployment of digital components, in society and in companies, requires "access to increasingly large bandwidths. Around the world, states continually enhance their standards defining broadband and very high speed. According to the World Bank, access to high-speed networks has a positive effect on the development of human capital on business productivity and on the ability of communities to attract a highly skilled workforce. Cameroon should have a good percentage (more than 50%) of medium and large businesses with Internet connections". Digital infrastructures come with important challenges: Internet accessibility at very high speed (few households have access to an Internet connection service exceeding 1Mbps) throughout Cameroon; "the development and

availability of telecommunications technologies (optical fibre and satellite) to the needs of businesses in remote (rural) areas, including in landlocked areas like eastern Cameroon; investments to enhance existing infrastructure capacity; collaboration between the various levels of the Cameroonian administration (central, regional and municipal); and competitive rates for Internet services at very high speed. The main issue in digital infrastructure resides in the availability and accessibility of digital infrastructure with high quality for companies across Cameroon", Atsa et al (2016).

1.1.5.5. Governance

In recent years, the Government of Cameroon has set goals for IT governance by launching some initiatives related to the Government strategy on IT. The National Agency of ICT (ANTIC) is one of these initiatives among others. These initiatives intend to optimize ICT to ensure more rigorous management of public finances and increased efficiency of government operations. This is a new project of the renovation of the State through ICT. The question of governance is discussed in economic terms, precisely that of "entrepreneurship, innovation and growth enterprises in the context of the transition to the digital economy. The open and decentralized architecture of the Internet and the free flow of data across borders raise several questions such as requirements for routing. Thus, like its peers, the government of Cameroon must constantly be on the lookout for technologies emerging to intervene in good time if necessary" Deloitte (2012). On the other hand, regulations may accelerate or delay the invention, innovation and dissemination of new technologies.

In addition to the economy-related legislation (price controls, tariff barriers, monopolies), "the government of Cameroon should adopt increasingly social regulations (standards environmental, privacy). In this context, Cameroon must strike a balance between protecting users and providing sufficient freedom necessary for new technologies to develop. In addition, users' trust is also an element essential to the development of new technologies" Al-Khouri (2012). The main issue for governance is the joint development and implementation by the government, the private sector and civil society, of principles, norms, rules, processes and programmes, so as to frame and support the development and use of digital technologies.

1.1.5.6. Digital Economy Policy in Cameroon: An Assessment of the 2007 – 2020 Strategy Implementation

The digital transformation is re-shaping our global economy, permeating every sector and aspect of daily life, changing the way we learn, work, trade, socialize, and access public and private services and information. According to the World Bank Group 2019 Report, in 2016, "the global digital economy was worth about US$11.5 trillion, equivalent to 15.5 percent of the world's overall

gross domestic product (GDP). It is expected to reach 25 percent in less than a decade, quickly outpacing the growth of the overall economy". However, countries such as Cameroon still only capture a fraction of this growth and need to strategically invest in the foundational elements of their digital economy to keep pace.

Universal adoption and effective application of digital technology are expected to characterize future economies, "shaping their ability to succeed in the global marketplace and offering a better quality of life for their citizens. Disruptive technologies are already altering traditional business models and pathways to development, yielding significant efficiency, productivity gains, and increased convenience, as well as supporting better access to services for consumers. Well-functioning digital economies thus may offer the potential to achieve faster economic growth, offer innovative products and services, and create more job opportunities", World Bank Group (2016).

The framework that shapes the assessment looks at five foundational elements of the digital economy:

- ✓ Digital infrastructure: the availability of affordable and quality Internet, which is instrumental to bringing more people and businesses online;
- ✓ Digital platforms: the presence and use of digital platforms that can support greater digital exchange, transactions, and access to public services online;
- ✓ Digital financial services: the ability to pay, save, borrow, and invest through digital means, which is key to increasing financial inclusion and the e-commerce market;
- ✓ Digital entrepreneurship: the presence of an ecosystem that supports entrepreneurs, start-ups, and bigger companies to generate new products and services that leverage new technologies and business models, which is critical to widen and deepen digital economic transformation;
- ✓ Digital skills: the development of a tech-savvy workforce, with both the basic and advanced digital skills to support increased technology adoption and innovation and enable investments in high value-added services.

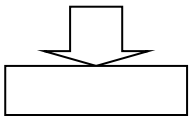
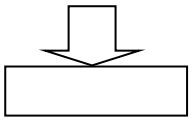
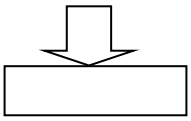
According to the World Bank 2019 diagnosis, Cameroon is displaying a relatively fair but feeble performance in terms of digital infrastructure, digital financial services and digital entrepreneurship compared to regional peers (and low performance compared to more advanced countries). In the 2017 ICT Development Index (IDI) of the International Telecommunications Union (ITU), Cameroon ranked only 149 of 176 countries and was the 18th ranked country in Africa. Cameroon's IDI score highlighted only relative strengths in terms of penetration of mobile telephony and international access.

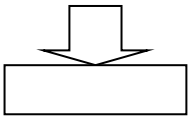
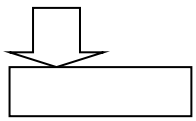
The diverse financial landscape features a large number of active formal institutions (454). Yet, the “Cameroon market is in the start-up stage for its digital financial services (DFS) ecosystem; financial inclusion in Cameroon has room for growth, and the usage of DFS remains low. Finally, although Cameroon has one of the highest rates of early-stage entrepreneurial activity, its economy ranks in the lower tier of global assessments on entrepreneurship, innovation, and competitiveness. Doing business within Cameroon involves high costs and complex procedures: Cameroon ranks 166th among 190 economies in the 2019 Ease of Doing Business, the lowest ranking among regional competitors”, World Bank (2019).

The country “lags behind other comparable countries on the other two pillars of the digital economy, namely digital platforms and digital skills. Data on key indicators to assess the state of digital platforms in Cameroon are not available, which in itself is a strong indication of the work that remains to be done to improve the development, access, and use of digital platforms in Cameroon. Notably, the digital government platforms offered across different government agencies are not interconnected and interoperable. Cameroon’s level of spending on education is below the average of both Sub-Saharan Africa and peer countries”, World Bank (2019).

The low quality of education and limited market relevance of skills development programmes translate into youth being poorly prepared for the labour market and post-secondary studies. At “the tertiary level, most students enrol in the general stream and few study science and engineering. Recognizing these challenges, the government is committed to developing digital skills at all levels of its national education system to achieve the Sustainable Development Goals” (SDGs), as reflected in the Education Sector Strategy 2020–2030 under preparation.

Table 14: Key indicators of Digitalisation in Cameroon (MINPOSTEL, 2015)

Pillar	Overall Performance	Key indicators			
		Indicator	Source and date	Cameroon	SSA Average
Digital Infrastructure		Penetration of 3G/4G (%)	ART 2017 and GSMA 2020	87%	74%
		% of population covered by 3G Mobile network	MINPOSTEL 2017 and GSMA 2019a	90%	70%
		Average monthly retail price of mobile broadband as % of GNI	ITU 2017 2017 and GSMA 2019b	3.1%	1.4%
Digital Platform		Digital Adoption Index-Government Cluster	World Bank 2016	0.45	0.39
		Open Data Inventory Score	Open Data Watch	Score 36/100	Ranks 19 of 43 countries
		E-participation Index	UN 2016	0.16	0.25
Digital Financial Services		Adults Access to a transaction account (%)	Findex 2017	34.6%	42.6%
		Mobile money access rate	IMF financial access survey and GSMA 2018	15%	45.6%
		Adults who saved at a formal institution (%)	Findex 2017	10.9%	26.9%

Pillar	Overall Performance	Key indicators			
		Indicator	Source and date	Cameroon	SSA Average
Digital entrepreneurship		Innovation Capacity ranking (and score)	Global Innovation Index 2018	111 of 126 score 23.85 of 100	n/a
		Firm-level technology absorption 1=Not at all; 7=To a target extent	WEF Global Information Technology Report (GITR) 2016	4.4	n/a
		% of firms with access to email	World Bank Enterprise Survey	54.4 (2016)	58.5
Digital skills		Skills Readiness Index	The Global Information and Technology Report 2016	3.8 (107 out of 139)	n/a
		Internet access in schools	World Economic Forum 2017-2018	3.7 (91 of 139)	n/a

1.1.6. Energy Present Status in Cameroon

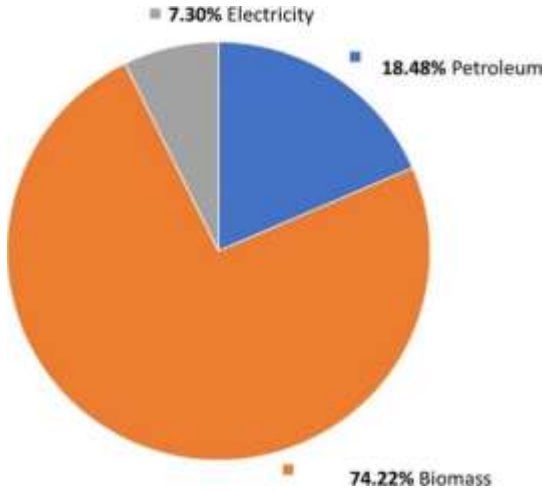
As the world is shifting away from "conventional fossil fuels towards renewable energy sources, the power industry is starting to invest more in sustainable clean energy installations rather than the traditional large-scale infrastructures, which rely mainly on oil and coal" (Kaoga et al., 2021).

Above and beyond its environmental benefits, this shift to renewables is very likely to benefit economic growth as well. A recent study of the International Renewable Energy Agency shows that, indeed, doubling the share of renewables in the energy mix by 2030 would lead to a rise of global

Gross Domestic Product (GDP) up to 1.1 percent. It would also improve global welfare by 3.7 per cent and support the creation of over 24 million jobs in the sector all over the world.

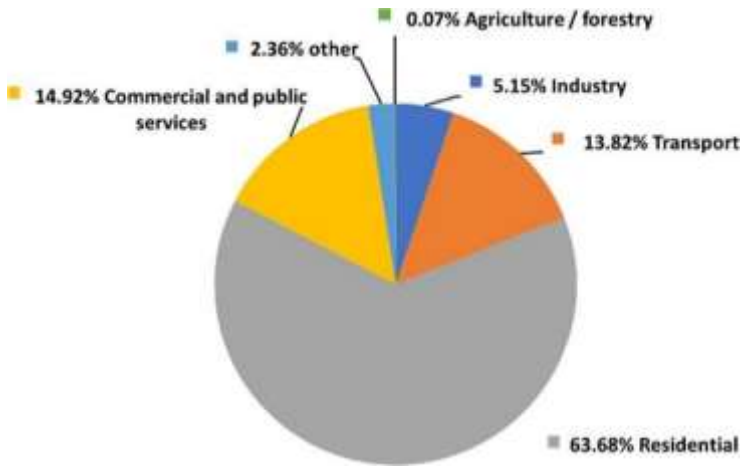
In order to achieve these goals, digitalization is considered as a key factor. According to the International Energy Agency, digitalization is set to make energy systems, particularly power generation systems, more safe, productive, accessible and sustainable. Cameroon's energy consumption shows that biomass, electricity and petroleum are three main sources of energy. Biomass consumption accounts for 74.22%, followed by petroleum (18.48%) and electricity (7.30%)", as illustrated by graph 7. In 2018, the total final energy consumption in the country was 7.41 Mtoe and was dominated by traditional forms of biomass.

Graph 7: Total final energy consumption by source in Cameroon (Kaoga et al., 2021)



The residential sector shares "63.68% of the total final energy and depends largely on biomass. The Commercial and public services (14.92%), transport (13.82%), industry (5.15%) and agriculture / forestry sectors (0.07%) rely on petroleum and electricity. Graph 7 illustrates the share of energy consumption by sector.

Graph 8: Total final energy consumption by sector in Cameroon (Kaoga et al., 2021)



The country's installed electricity generation capacity “rose to 1402 MW, 56.15% of which was from hydropower, 43.84% from fossil fuels (17.55% from natural gas and 26.29% from oil) and 0.01% from solar photovoltaic” Kaoga et al. (2021). The promotion of renewable energy is an important part of Cameroon's plan to increase energy security and provide job opportunities to the country. Unfortunately, “the lack of proactive and long-term renewable energy policy and laws, in addition to less attention paid to renewable energy training and research, financing mechanisms, and unaffordable costs of renewable energy technologies to the poor population are amongst present issues hindering the development of renewable energy in Cameroon”.

Hence, the present status of renewable energy exploitation and development in Cameroon shows that the country should develop a new economic resource: digital economy. The latter is improving millions of lives and rapidly transforming societies. Cameroon has a unique opportunity to become more sustainable and create economic growth through development of skills for the digital economy for “a better use of data, instead of using old technologies that consume fossil fuels. Digitalisation has many benefits: It speeds up the spread of information, brings people closer together, creates jobs and makes societies more efficient”, Kaoga et al. (2021).

1.1.7. Difficult Access to Employment for Youths

The informal sector remains the main source of employment in Cameroon. In practice, the formal sector is characterised by stable, declared employment and which gives rise to social benefits, whereas the informal sector, on its part, distinguishes itself by undeclared, precarious and poorly remunerated jobs and offers less protection to workers. Data stemming from ECAM 4 indicate that 89.4 % of actively occupied individuals work in the informal sector, and only 10.6 % among them are in the formal sector, of which 5.9 % are in the public sector and only 4.7 % in private sector. Given the specialisation of the rural population in agriculture, the informal sector is more important (94.7 %) than the urban areas (88 %). Moreover, as a result of the flexibility for entering into the informal sector, the vulnerable segments of the population are increasingly represented. As such, in 2014, 95.8 % of persons aged between 15 and 24 years were working in this sector. The difference of 10 percentage points with the employment rate in this sector of other age brackets (25 to 34 years and 36 to 64 years) suggest that a marginal segment of primo young job seekers use the informal sector as a stepping stone for transiting into the formal sector.

The table bellow shows that access to employment reduced the level of education of all age groups. In a labour market structure where the modern sector barely offers 10 % of jobs, there exist few opportunities for more qualified individuals. This situation can be explained by the drop in the employment rate with the level of education for all age groups. For the more active youths aged

between 25 and 35 years, the unemployment rate is five times higher for active persons having a higher level of education than for persons out-of-school.

Table 15: Employment status per level of education and age group (in %) (2019 RESEN based on ECAM4 findings)

Age	Out-of-school		Primary		Secondary 1st cycle		Secondary 2nd cycle		Higher education	
	Unemployment	Employment	Unemployment	Employment	Unemployment	Employment	Unemployment	Employment	Unemployment	Employment
15-24 years	5.8	94.2	7.3	92.7	9.3	90.7	12.9	87.1	32.8	67.2
25-35 years	3.0	97.0	4.2	95.8	7.3	92.7	10.2	89.8	14.8	85.2
36-64 years	1.3	98.7	2.2	97.8	4.0	96.0	5.5	94.5	3.0	97.0
15-64 years	2.6	97.4	4.0	96.0	6.9	93.1	9.2	90.8	14.4	85.6

For youths, on-the-job-technical and vocational training is more relevant than formal training to have access to employment. When the analysis is done according to the type of education, it seems that for youths (from 15 to 35 years), hands on training is associated to more important employment rate (93.1 %) than academic training or technical and vocational training offered in training institutes (89.1 %).

Employment access difficulties faced by beneficiaries of technical and vocational training gleaned from training institutes can be explained by their poor relevance. According to a survey carried out at the level of employers (2015), only 42 % of employers declare themselves fully satisfied with the skills of their staff having qualifications developed within the framework of teaching as well as technical and vocational training. The dissatisfaction pertaining to the level of competence of these graduates is particularly important for employers of the agriculture, wood, construction and cotton/textile sectors.

The weak development of skills for the digital economy as well as the low quality of teaching and vocational training can mainly be explained by weaknesses in structuring supply. The limited collaboration between training institutions and employers undermines the introduction of skills training adapted to the market, for the design of training programmes is not guided in relation to the private sector and students have few placement possibilities and practical training. Employers are not involved in the design and implementation of programmes. The quality of technical and vocational training programmes is also affected by the lack of teaching and learning materials, poor quality of infrastructures, low level of qualification and limited exposure of teaching staff to field realities.

The results of the diagnostic analysis show the mismatch between the two entities. On the one side, the economic circles do not get quite enough to satisfy its needs, and on the other, the education system sends out graduates who find it difficult to integrate into the economic world or who integrate into jobs less compatible with their level of training. It is clear, given the results, that the multiplication of structures in charge of training and various available offers have not significantly improved this match. It has increased the costs of transactions, duplications and difficulties to entrench a harmonised policy.

1.1.8. The Constantly High Poverty Level Constitutes a Hindrance to Schooling

With a Human Development Index of 0.576 in 2020, Cameroon is ranked 150th out of 191 countries, in the group of countries with an average human development. Its index is slightly higher than the average of Sub-Saharan African countries (0.547).

The prevalence of poverty constitutes a hindrance to schooling. The proportion of persons (workers and their families) living with less than 1.90 USD per day and per person stood at 21.3% in 2021 (United Nations, SDGs Data Base). It stood at 27% in 2000. It reached its lowest level of 19.7% in 2019 before the outbreak of the Covid-19 pandemic. Even with an education that would be entirely free, the provision of schooling to the poorest segment of society remains a cumbersome task. In addition to direct schooling costs, opportunity costs generated by schooling contribute in excluding from school, children from the fragile segments of the population. Given the budgetary restriction, some families decide to give priority to the education of boys to the detriment of educational opportunities of girls or vice-versa.

This state of poverty in households does not help integrate ICT into teaching-learning transactions as it should be. Parents and students may be aware of the importance of ICT in enhancing educational standards, but the economic restriction remains a hindrance.

1.2. Statement of the Research Problem

Trilling and Fadel 2009 confirms that around the world this “digital skills gap” is costing business a huge amount of money. It is estimated that “well over $200 billion a year is spent worldwide in finding and hiring scarce, highly skilled talent, and in bringing new employees up to required skill levels through costly training programmes”. And as budgets tighten further in tough economic times, “companies need highly competent employees ready to hit the ground running without extra training and development costs”.

In the 2020 - 2030 National Development Strategy, the Cameroon Government is focused on: "Promoting an education system at the end of which any young graduate is sociologically

integrated, bilingual and competent in a field that is vital for the development of the country and aware of what he must do to contribute to it". In order to meet the challenge of developing the economy by producing competent citizens in the secondary education sub sector, the government has made efforts towards the development of skills for the digital economy.

The ministry and the PTAs have provided schools with computers for pedagogic purposes. These computers are destined to students on the one hand, and to teachers on the other. However, the national ratio shows that 33 secondary school students share one computer and teachers 6 share one computer. Looking at the distribution of multimedia centres, the creation rate from 2017 to 2019 stands at 0.03% within that period (MINESEC, 2020). As a matter of fact, 32.8% of youths aged 15 - 24 and holders of GCE AL and Baccalaureate are unemployed (2019 RESEN based on ECAM4 findings). This shows that they lack in some basic skills and a wide range of applied skills: oral and written communications; professionalism and work ethics; critical thinking and problem solving; working in diverse teams; teamwork and collaboration; and project management.

In a period of high demands in the Cameroon labour market and constant technological changes in the society, much influenced by global trends that underscore the need for a dynamic and comprehensive education, there is a rising criticism about the unpreparedness of secondary school students. Therefore, I proposed to investigate on how to equip secondary school students with skills for the digital economy so as to meet the needs of today's labour world.

In that vein, I examined how policy design influences the development of skills for the digital economy on secondary school students. In addition, I explored how programmes and curricula influence the development of skills for the digital economy on secondary school students. I also looked at how Governance influences the development of skills for the digital economy on secondary school students. Next, I laid emphasis on how equipment influences the development of skills for the digital economy on secondary school students. And last but not the least, I searched on how teaching methods influence the development of skills for the digital economy on secondary school students.

1.3. Objectives of the Study

This study has a main objective as well as specific objectives to guide the focus of our investigation.

1.3.1 Main Objective

The main objective of this study is to determine the extent to which the education system influences the development of skills for the digital economy amongst secondary school students in Cameroon.

1.3.2. Specific Objectives

The operationalization of this main objective has yielded the following specific objectives:

- ✓ To verify the relationship between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon;
- ✓ To investigate the relationship between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon;
- ✓ To examine the relationship between governance/policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon;
- ✓ To scrutinise the relationship between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon;
- ✓ To study the relationship between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon.

1.4. Research Questions

In order to guide the steps of our research focus, the following research questions (main question and specific questions) were formulated:

1.4.1. Main Research Question

Our main research question is: To what extent does the education system influence the development of skills for the digital economy amongst secondary school students in Cameroon?

1.4.2. Specific Research Questions

Our main research question was operationalised into five specific research questions:

- ✓ Does policy design significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?
- ✓ Do programmes and curricula significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?
- ✓ Does governance/policy implementation significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

- ✓ Do infrastructure and equipment significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?
- ✓ Do teaching methods significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

1.5. Research Hypotheses

In a bid respond to the above-mentioned research questions, a general hypothesis and specific research hypotheses have been formulated.

1.5.1. General research Hypothesis

Our general research hypothesis was formulated as follows: The education system significantly influences the development of skills for the digital economy amongst secondary school students in Cameroon.

1.5.2. Specific Research hypotheses

Five specific research hypotheses emerged from the operationalisation of the general research hypothesis:

- ✓ **RH1:** There is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.
- ✓ **RH2:** There is a significant correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon.
- ✓ **RH3:** There is a significant correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon.
- ✓ **RH4:** There is a significant correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.
- ✓ **RH5:** There is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary students in Cameroon.

1.6. Justification of the Study

Several factors underline the decision to study this topic. First, the policy designers' contribution in the development of children's digital skills so as to meet the requirements of the job market which is more demanding in terms of productive skills. In collaboration with the employers

(public and private) they can design an education policy that gives more chances for employability. The conflict can come in on how to create that contribution and whether policy makers feel the activity is worthwhile. Secondly, the study will also be important to parents who wish to make a positive and responsible contribution in the development of their teenagers. By raising awareness that besides the fact of youngsters benefiting from their social capital in future, they can also contribute and encourage them to tap from their human capital as they grow. Thus, it might go a long way to help parents give attention and maximum support to the development of skills for the digital economy in children. They will also learn that it is advantageous to blend formal learning in school with non-formal learning/vocational education at home and during holidays.

In addition, this thesis may be important to secondary school teachers, especially those in urban areas who are facing unprecedented change, with often larger classes, more diverse students, demands from the government who wants more accountability on the development of graduates (who are workforce), having to cope with ever changing technology under difficult health conditions due to the Covid-19 pandemic. To handle change of this nature, teachers and instructors need a base of theory and knowledge that will provide a solid foundation for their teaching, no matter what changes or pressures they face. Teaching methods need to be used that help to develop and transfer specific skills that serve both the purposes of knowledge development and dissemination, while at the same time preparing graduates for work in a knowledge-based society.

Finally, although technology is a core focus of this research, we are not advocating ripping up the current human-based educational system and replacing it with a highly computerised model of teaching. We believe that although there is a great need for substantial reform, there are many enduring qualities of a well-funded and publicly supported education system based on well trained and highly qualified teachers that will be hard if not impossible to replace by technology.

1.7. Delimitation of the Study

This study has delimitation from the thematic and geographical, temporal and spatial points of view.

1.7.1. Thematic Delimitation

From the thematic point of view, it will focus only on some key components of the education system (policy design, programmes and curricula, governance, equipment and teaching methods and how they influence the development of skills for the digital economy among secondary school students. This implies that the study will not dwell on related aspects such as the development of

skills in core academic subjects such as literacy, numeracy or language skills. The skills for the digital economy will be limited to:

i. **Human skills** (critical thinking, creativity, communication, analytical skills and collaboration);
ii. **Digital building block skills** (data analysis, data management, software development, Computer programming, and digital security and privacy);
iii. **Business-enabler skills** (communicating data, digital design, project management and business process).

Also, when dealing with digital education, we shall only lay emphasis on the use of internet, not on micro clouds, radio, television nor autonomous learning guides.

1.7.2. Geographical Delimitation

From the geographical aspect, this study is limited to the Republic of Cameroon. Specifically, it will involve the female and male students of General Education who graduated from both government and private secondary schools. The country is made up of 10 regions and 11 state universities. The country was divided into 4 and one university was selected for each group. For the first group, made up of the Far-North; North and Adamawa regions, 200 respondents were selected from the University of Maroua. For the second group, made up of the South, Centre and East regions, 265 respondents were selected from the University of Yaoundé I. As concerns group 3 consisting of the West and Littoral region, 200 respondents were selected in the University of Douala. And for group 4 represented by the North-West and South West regions, 200 respondents were selected in the University of Buea.

1.7.3. Temporal Delimitation

This study was carried out from November 2020 to March 2023.

1.7.4. Spatial Delimitation

The focus of this research is on Level 1 and 2 students of the universities of Maroua, Douala, Buea and Yaoundé I. A total number of 865 respondents were selected form those institutions. Also, officials of central and devolved services in charge of digital education in MINESEC were interviewed.

1.8. Significance of the Study

1.8.1. Theoretical Significance

The findings of this study will add to the current body of knowledge on the role of the education system in the development of skills for the digital economy among secondary school students. This study will contribute to closing the current knowledge gap existing between the rest of the world especially the western world at large, and Cameroon in particular. The findings may also propel reflections on the possibility of refining or extending the current theoretical frameworks that explain this phenomenon to incorporate empirical evidence from Cameroon and Africa.

1.8.2. Pedagogic significance

This study will be relevant to students, teachers, principals, decision-makers, parents and the education community. It shall develop a mixed teaching approach for better teaching-learning transactions.

1.8.2.1. To Students

This research focuses on raising awareness in students on the importance of developing e-skills and the role they have to play on the development of digital economy. In return, this will enable them to be more competitive and efficient in the job market.

1.8.2.2. To Teachers/Lecturers

Cameroon education system lays more emphasis on the use of technology in pedagogy. One of the key elements is skills development through the use of ICTs. Therefore, teachers are the main actors to develop the skills for the digital economy. This study will enlighten teachers and lecturers to effectively plan and use ICTs in their teaching-learning transactions. Also, technology cannot replace teachers, but teachers who master technology can replace those who do not. Through this research, teachers will develop more competences in order to help the students develop the expected e-skills.

1.8.2.3. To Decision-Makers

Prioritising and supporting the development of digital economy skills broadly contributes to the ambitions of the education and training sector, and will help foster a prosperous, higher skilled and higher wage economy. Digitally-skilled employees benefit from higher salaries, and this is essential for Cameroon's inward investment pipeline in support of the Cameroon Government's Digital Economy Policy. The role of the government is to ensure people have the skills they need to meet the demands of an ever-changing economy and society, and that employers invest in the skilled

employees they need to grow their businesses. In that token, this research can orientate the development of a National Policy on Digital Economy with an implementation plan.

For the Education and Training Sector, officials of central and devolved services of the subsectors, teachers, guidance counsellors, social workers and parents this study can orientate the formulation of best practices regarding the development of 21st century skills among adolescent students. Policy makers can also discover the findings of this study relevant in informing their decision-making practices related to the subject matter.

1.8.2.4. To Parents and the Education Community

Increasing integration of digital technology into the everyday life of a small business owner and sole trader is important in tackling skills gaps in the workforce. Embracing digital technology can help businesses in every sector across Cameroon be more productive.

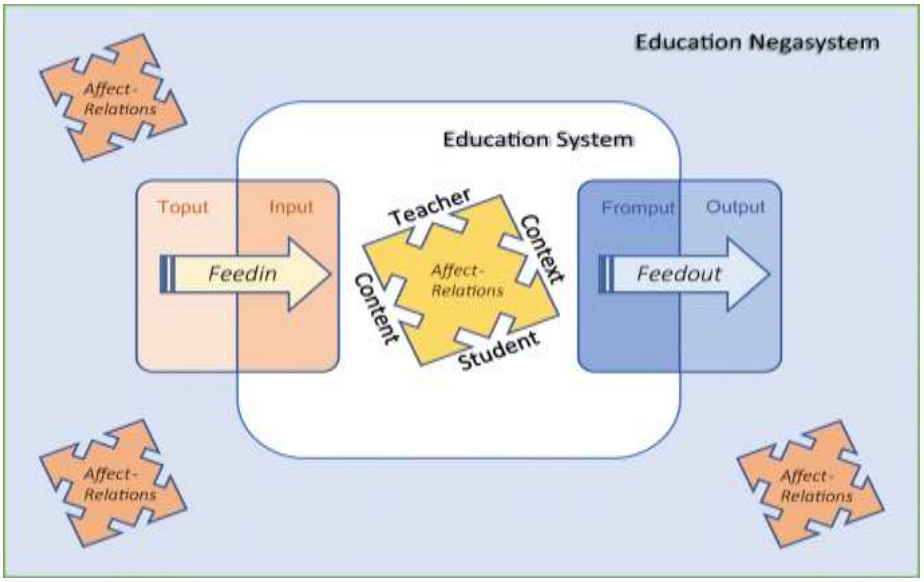
1.9. Definition of key terms

Education system

An education system is an intentional system. Intention refers to willing, i.e., trying to do, seeking a goal. The primary goal of an education system should be to guide student learning. The latter estimates that "an education system requires:

- ✓ One or more teachers to guide student learning;
- ✓ One or more students who intend to learn;
- ✓ Guidance of learning that occurs in a context (i.e., a setting which also includes content for learning)" (https://educology.iu.edu/educationSystem.html)

Graph 9: The education System (Frick, 1991)



Frick (1991) incorporated systems thinking to "identify seven types of relationships in educational systems: teacher-student, student-content, student-context, teacher-content, teacher-context, content-context, and education system-environment relationships. He revisits these education system relations and discusses potential futures of education. The World Wide Web did not exist when he wrote the original treatise, nor did wireless smartphones and tablets, Google's search engine, YouTube, Facebook, or Wikipedia". However, one important education system relationship should not change: the affective bonding between teachers and their students.

Information and Communication Technology (ICT)

Many scholars have discussed "the difficulty in reaching a consensus on the definition of ICT" (Elisha, 2006; Jamieson-Proctor and Finger, 2008; Hamid and Zaman, 2010; Hesterman, 2011; Kahiigi et al., 2009), due to the rapid changes and development in this area. Although various definitions of ICT have been reported in the literature, the two presented below are the most widely shared.

Tinio (2003) defines ICT as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information" (p. 4). This is similar to the definition used by Cohen, Salomon and Nijkamp (2002): "ICT is a collection of technologies and applications which enable electronic processing, storing and transferring of information to a wide variety of users or clients" (p. 34). These definitions highlight "two important aspects. The first is related to the variety or collection of technologies and applications, which may include hardware (e.g. computers and other peripheral devices) or software and connectivity (e.g. access to the Internet, local networking infrastructure, video conferencing and other applications). The second aspect of ICT is related to those technologies that are used for processing, storing and transferring/communicating information. Here, the term ICT covers any product that creates, stores, retrieves, manipulates, transmits or receives information electronically in a digital form" (Elisha, 2006; Wee and Zaitun, 2006).

A more elaborated definition of ICT is given by Elisha (2006), who describes ICT as follows:

"…[A]n umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning" (Elisha, 2006, p. 35).

This definition specifies ICT in terms of the kinds of technology that are considered. Furthermore, it includes distance education as an ICT application. It is clear from the above

definitions that in the educational field, ICT and its applications can be used for many different purposes. Firstly, ICT can be seen as a subject in its own right that involves the development of technology and the analysis of its impact on society. Secondly, ICT can be used to support pedagogical activities and deep learning by making education more personalised, emotive, creative, flexible and dynamic. For example, in the pedagogical activity of e-learning, ICT is used to support all educational activities (Kahiigi et al., 2009). This includes hardware such as computers and mobile phones, and also software such as email, chat and learning management systems (LMS).

There is also "a more restricted form of e-learning called 'blended learning' that can be briefly described as a mix of e-learning and traditional classroom learning" (De Boer, 2004). In the last decade, "a new variation of e-learning has emerged called 'm-learning' (mobile learning), which makes use of portable wireless technologies such as digital media players, smartphones, and personal digital assistants; this differentiates it from e-learning" (Evans, 2008). "The rapid evolution of this technology and its application in different forms in education means that it is difficult to identify a common definition for e-learning", Arkorful and Abaidoo (2015).

Thirdly, ICT can be used to support educational management, which involves a variety of technological applications such as financial and administrative management, or any other activity related to the organisational aspects of the institution (Kipsoi, Chang'ach, and Sang, 2012; Zain et al., 2004; Kozma, 2008). Fourthly, ICT can be used to "enhance the creation of research networks" (Howells, 1995; Kommers et al., 2014), and it has contributed to the modernisation of academic library services (Ani et al., 2005; Parvez, 2011). Although there are differences in the types of roles that ICT plays within education, "the common denominator is that ICT functions as a catalyst for a diversity of changes in education at all levels" (Mooij and Smeets, 2001; Sangra, and González-Sanmamed, 2011).

It is also important to mention that the implementation of ICT does not immediately bring forward concrete and desirable transformations; for example, a common barrier at classroom level is that teachers tend to rely on traditional teaching methods, and resist the integration of ICT into teaching activities. It is clear that the integration of ICT into education is not an easy matter, as it is still difficult for some educational institutions to allocate enough resources to support its implementation (Barron et al., 2001; Muianga et al., 2013).

The long debate over the use of ICT in education has never been the subject of consensus worldwide. There have always been both supporters and opponents, particularly in relation to developing countries. Over the last ten years, several studies of the use of ICT in education reported by specialists and international organisations have highlighted the failure and the inconclusiveness

of the evidence of the impact of ICT on educational quality, (Lubbin, 2018). Conversely, other experts have found that the use of ICT has undergone developments within this period, and have defended these great changes.

The advances in ICT over the last decade mean that "human beings must be willing to adapt to new challenges in various sectors of society, including in the educational sector. In the previous decade, the primary concern of educational institutions has been the ratio of computers to students; however, students and teachers now generally have access to more than one device connected to the Internet. It is also believed that if the Internet, tablets, computers, applications and other platforms are used with clear goals to stimulate students' imaginations and support the work of teachers, they can have positive impacts outside of student engagement (Thilakarathna et al., 2010; Turcano, 2016).

The emergence of "the Internet of Things (i.e. devices used to offer connectivity for everyday objects) has made a difference in the field of education, since this can offer students access to educational tools at anytime and anywhere (Asseo et al., 2016). Smartphones, tablets, e-book readers and computers can be used to access virtual environments such as libraries and laboratories, among others" (Dresselhaus and Shrode, 2012).

Another important development over the last decade is related to "cloud computing, which allows virtual files to be stored and shared without the need to install applications on the teacher's or student's machine" (Romero-Zaldivar et al., 2012). This evolution allows "users to work with a great deal of content even without the aid of devices such as CDs and pen drives, simply by storing everything in the cloud. Thus, cloud computing offers a true revolution in the educational field; it can even replace heavy books with virtual files and, in particular, facilitate access to such material" (Gosavi, Shinde and Dhakulkar, 2012). Another feature of cloud computing is related to the speed with which access to information is provided. Access can also be offered through iPads, notebooks and desktop computers, among other devices.

Recently, following the "significant expansion of social networks, some educational institutions have begun to pay attention to this new way of disseminating information among students" (Alwagait, Shahzad and Alim, 2015). Social networks can "generate new synergies among members of an educational community, such as by facilitating the sharing of information on topics studied in the classroom or in group study, and can disseminate diverse information content by sharing resources (documents, presentations, links, videos)". The involvement of students and teachers creates a channel of communication with other people outside of the institution.

Nowadays, the production of audio-visual material is becoming increasingly easy, as confirmed by the number of such programmes that are available for free or via streaming services on the internet. This also involves changes in education, as it allows teachers and students to work with educational materials that are capable of offering a better understanding of various subjects. Ten years ago, the primary concern of education in this area was the development of basic ICT literacy for teachers and students; today, this concern has been replaced by the importance of coding and computational thinking.

Thinking about the future of education involves knowing how to apply the range of new resources that are emerging. When teachers do not take advantage of new technologies for educational purposes, it gives space for these technologies to end up acting contrary to the ideal. The use of ICT in education is inevitable, and it is important to understand trends that can ensure a better teaching and learning process in the future.

In a nutshell, ICT in education can be defined as the use of "all telecommunication devices and applications (hardware and software) to support activities related to an educational institution". This includes pedagogical, organisational, administrative and management activities. In this research, ICT in education is defined as the use of Internet, World Wide Web, blockchain technologies and applications (hardware and software) to support pedagogical activities.

Digital Economy

Brynjolfsson and Kahin (2000b) state that the term "digital economy" refers specifically to "the recent and still largely unrealized transformation of all sectors of the economy by the computer-enabled digitization of information".

Bukht, et al (2017) provide us with a table of definitions for digital economy and the focus for each definition.

Table 16: Evolving definitions and concepts of the digital economy (Bukht, et al 2017)

Source	Definition	Focus
Tapscott 1996: The Digital Economy: Promise and Peril in the Age of Networked Intelligence	No direct definition but called it the "Age of Networked Intelligence" where it is "not only about the networking of technology… smart machines… but about the	Said to have first coined the term "digital economy". Emphasised that the digital economy explains the relationship between the new economy, new business and new technology, and how they enable

	networking of humans through technology" that "combine intelligence, knowledge, and creativity for breakthroughs in the creation of wealth and social development".	one another.
Lane 1999: Advancing the Digital Economy into the 21st Century (Assistant to the US President for Science and Technology)	"…the convergence of computing and communication technologies in the Internet and the resulting flow of information and technology that is stimulating all of electronic commerce and vast organisational changes".	Focused on e-commerce and the wider ramifications of the digital economy around issues such as privacy, innovation, standards, and the digital divide.
Margherio et al. 1999: The Emerging Digital Economy (US Commerce Department)	No explicit definition but identified four drivers: "Building out the Internet ... Electronic commerce among businesses ... Digital delivery of goods and services ... Retail sale of tangible goods".	First clear segmentation of the digital economy. Emphasised foundations of digital economy more than economy itself.
Brynjolfsson and Kahin 2000b: Understanding the Digital Economy: Data, Tools, and Research	"...the recent and still largely unrealized transformation of all sectors of the economy by the computer-enabled digitization of information".	Emphasised understanding the digital economy from various angles: macroeconomics, competition, labour, organisational change.
Kling and Lamb 2000: in Brynjolfsson and Kahin 2000a	"...includes goods or services whose development, production, sale, or provision is critically dependent upon digital technologies".	Segmented the digital economy into four parts: "Highly digital goods and services ... Mixed digital goods and services ... IT- intensive services of goods production" and the IT industry.

Mesenbourg 2001: Measuring the Digital Economy (US Bureau of the Census)	Defined the digital economy as "having three primary components": - "E-business infrastructure is the share of total economic infrastructure used to support electronic business processes and conduct electronic commerce" - "Electronic business (e-business) is any process that a business organization conducts over computer-mediated networks" - "Electronic commerce (e-commerce) is the value of goods and services sold over computer-mediated networks".	Focused on how to measure the emerging phenomena of e-business and e-commerce.
Economist Intelligence Unit 2010: Digital Economy Rankings 2010	No explicit definition but ranking of digital economy is based on: "The quality of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit".	Emphasis on the foundations for a digital economy rather than the digital economy itself with measures of: connectivity and technology infrastructure, business environment, social and cultural environment, legal environment, government policy and vision, and consumer and business adoption.
OECD 2013: The Digital Economy	"The digital economy enables and executes the trade of goods and services through electronic commerce on the Internet".	Main content relates to competition and regulation in digital markets, with additional discussion of network effects, interoperability, and open vs. closed platforms.

In the course of this study, digital economy shall be referred to as the global network of economic and socio-cultural activities that are enabled by digital technology, such as the internet, mobile networks and ICT tools.

Secondary School Students

These are students in their adolescent stage. It is a transitional stage of physical, cognitive and psychological development that generally occurs during the period from puberty to legal adulthood. The World Health Organization (WHO) defines an adolescent as any person between ages 10 and 19. This age range falls within WHO's definition of young people, which refers to individuals between ages 10 and 24. For the purpose of this work, the term adolescent children will be made used from time to time in the place of secondary school students.

CHAPTER TWO: REVIEW OF LITERATURE RELATED TO THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY

This chapter is focused on the literature review of the study. The literature is being reviewed in three main sections: the first section constitutes the conceptual literature. Here, the independent variables, the dependent, and the specific research variables are being reviewed in a conceptual framework. This, will however permit us to come out with the conceptual model which is unique to this study. The second section constitutes the related literature on scientific studies carried out around the world, Africa and Cameroon on the education system dynamics and the development of digital economy skills on secondary school graduates. This will permit this study to bring out the existing literature gap.

2.1. Conceptual Literature

This section of the reviews conceptual literature related to the main variables of the study. These include, the dependent variable which is the education system, under which we have sub variables such as: policy design, curriculum content, governance, equipment, teaching approaches, and teachers' skills. The dependent variable (Digital economy skills) will also be reviewed. The third section of the study focused on

2.1.1. Education system

> *"This is what our educational system has to encourage. It has to foster the social goals of leaving together, and working together, for the common good. It has to prepare our young people to play a dynamic and constructive path in the development of a society in which all members share fairly good in the good or bad fortune of the group, and in which progress is measured in terms of human well-being, not prestige buildings, cars, other such things, whether privately or publicly owned. Our education must therefore inculcate a sense of commitment to the total community, and help the pupil to accept the values appropriate to our kind of future".*
>
> *Nyerere (1967).*

The education system constitutes the proxy par excellence for opportunities and skilling for a dramatically changing world. Over the past decades, there has been much advocacy by

world leaders on the question of providing access and basic education by education systems around the globe. However, changing times have set in a new trend, and we have come to realize that access to education is not enough. In the same way, according to the 2022 World Bank report, we take note that access to literacy and numeracy learnings is not enough.

Education needs to "provide more comprehensive learning opportunities, and it can do this through an emphasis on the whole person in a way that is relevant to the local and global context in which they will learn and work". Focusing on the development of skills and including transferable and digital economy skills on the same plane of importance as literacy and numeracy can help counter the setting of narrow goals for learners. Those narrower goals grew out of an emphasis on content and knowledge accumulation to the exclusion of much else as depicted by today's job environment, tagged as knowledge or information based.

The foundational motive of teaching and learning the enabling skills of literacy and numeracy in the early years should not distract from the bigger goal of education: to fully guide and integrate an individual out into the world. It therefore follows that literacy and numeracy are not goals in and of themselves, but they are to be valued for the access they provide for the individual to function effectively in our society. Thus, education systems of our times should not invest all their interests primarily in literacy and numeracy, but in how these skills enable access to other learning and living opportunities.

This work focuses on the formal educational system within the context of the learning ecosystem. The factors that play a role in broadening the education that the system delivers, are responses to the needs of the digital economy or digital job market. It suffices to note that there are myriad reports and findings on how education is failing students, on how skills beyond the "cognitive" are important, and on how digital economy skills have become foundational. Unfortunately, this is not being matched by policy on how the different parts of an education system work together to conceptualize and implement major change or build an adequate response.

In addition to the above, the measure of every education system has often been tied to the "quality of education". In this light, the education systems in middle and low-income countries have invariably been marked by a decline since the 1960s. the debate on the quality of education takes various dimensions which include:

2.1.2. Access to Schooling or Participation

By many measures, “the expansion of access to education globally, since education was adopted as a human right, has been a call for concern. When the Universal Declaration of Human Rights was adopted in 1948, the world population stood at 2.4 billion, with only 45% of those people having set foot in a school”, UNESCO, (2021). Today, with a global population at 8 billion, over 95% have attended school. The same report by UNESCO equally contends that enrolment in 2020 surpassed 90% in primary, 85% in lower secondary and 65% in upper-secondary education. This situation is compounding in Cameroon as statistics from the UNESCO Institute of Statistics (UIS, 2018) explained that classrooms have resolved to enrol more than their capacity because of population explosion in the country. This report precise that the Cameroonian population is growing in a geometric rate, and will surely approach 30 million by 2025.

As a result, school dropout has been a call for concern in the education sector. While “more than one in four children was out of primary school in 1970, the share in 2020 dropped to less than 10%. Improvements have been most evident for girls, who comprised almost two thirds of children out of school in 1990. With near gender parity achieved globally in education, girls are no longer disproportionately represented in the out-of-school population, except in the lowest income countries and in sub-Saharan Africa. Global participation rates went from just over 15% in 1970, to 35% in 2000, reaching over 60% in 2019” (UIS, 2018). The case is more serious in Cameroon as the presence of socio-political crisis in some regions of the country have shifted a huge student population to near-by secure regions thereby inflating the classrooms. As a matter of fact, a report by WES (2021) maintains that the classroom population as of today has increased 16 times before the escalation of the crisis in 2018.

However, “expansion of participation in education has led to a steady increase in youth and adult literacy rates between 1990 and 2020 across all countries regardless of development status. It also follows that growth in enrolment has also come with a feminization of higher education participation over the past fifty years. While participation in higher education was predominantly male in the 1970s and 1980s, gender parity was reached around 1990 and female participation has continued to grow faster than that of men since then”, UNESCO (2021). The “projections based on trends since 1970 indicate that high income countries could reach 100% participation rates as early as 2034, while middle income countries could reach between 60% and 80% participation rates in 2050”. On the other hand, “higher education participation rates

in lower middle-income counties will only reach some 35% by 2050, and less than 15% in low-income countries" (UIS, 2018).

2.1.3. Quality Learning and Achievement

Despite this "remarkable progress in expanding educational opportunity over the past decades, access to high quality education remains incomplete and inequitable. Exclusion from educational opportunity remains stark. One in four youth in lower income countries is still non-literate today" UNESCO (2021). This is evident in the same source when reporting that "even in middle income and upper income countries; the OECD Programme for International Student Assessment (PISA) has shown that sizable shares of the populations of 15-year-olds in school are unable to understand what they read beyond the most basic levels. This report further contends that even by conventional definitions, adult literacy rates are less than 75% in lower middle-income countries, and just over 55% in lower income countries". While gender gaps in adult literacy have also narrowed since 1990, they remain significant, especially for the poor.

This is confirmed by UNESCO (2021) as it comments that "in low-income countries, more than 2 out of 5 women are not literate. One in five children in low-income countries and one in ten across the globe. There has also been a significant increase in participation in pre-primary education around the world, across all regions and country income groups, especially since 2000. Global participation rates went from just over 15% in 1970, to 35% in 2000, reaching over 60% in 2019. In higher and middle-income countries, participation rates are converging, with near universal pre-primary participation expected by 2050. It also suffices to mention that expansion of participation in education has led to a steady increase in youth and adult literacy rates between 1990 and 2020 across all countries regardless of development status. Youth literacy rates in lower middle income and middle-income countries have now converged with those observed in upper middle-income countries at 90+%".

Moreover, "projections based on trends since 1970 indicate that high income countries could reach 100% participation rates as early as 2034, while middle income countries will be reaching between 60% and 80% participation rates in 2050. On the other hand, higher education participation rates in lower middle-income counties will only reach some 35% by 2050, and less than 15% low-income countries", UNESCO (2021).

Despite this "remarkable progress in expanding educational opportunity over the past decades, access to high quality education remains incomplete and inequitable. One in four

youths in lower income countries is still non- literate today. Even in middle income and upper income countries, the OECD Programme for International Student Assessment has shown that sizable shares of the populations of 15-year-olds in school are unable to understand what they read beyond the most basic levels, in a world in which demands for civic and economic participation become ever more complex. And yet, even by conventional definitions, adult literacy rates are less than 75% in lower middle-income countries, and just over 55% in lower income countries", WES (2021). This situation is more serious in Cameroon as the same author reports that the state of education in Cameroon depicts that the gap between urban and rural population is unprecedentedly wide in terms of literacy.

Also important to note is that while gender gaps in adult literacy have also narrowed since 1990, they remain significant, especially for the poor. In low-income countries, more than 2 out of 5 women are not literate. One in five children in low-income countries and one in ten across. Despite considerable advances in gender parity in schooling in Cameroon, chances of schooling for the girl child in rural zones remains stark.

Beyond access and participation, "the completion of school cycles is another dimension for quality measure. Worldwide, more than one in four lower secondary level students and more than one in two in upper secondary do not complete the cycle of study. Close to 60% of secondary school students in lower middle-income countries and almost 90% in low-income countries leave school before completing the secondary cycle. Such a dramatic loss of youth potential and talent is unacceptable. The massive scale of early school leaving may be explained by a range of factors, including weak relevance of learning content, lack of attention to the specific social needs of girls and the economic circumstances of the poor, lack of cultural sensitivity and relevance, and inadequate pedagogical methods and processes relevant to the realities of youth, UNESCO (2021). This is a largely overlooked dimension of what many have called a global "learning crisis".

2.1.4. Weak Relevance of the School Content and Teacher Preparation as Push Factors of Students Leaving School before Completion.

Insufficient quality in instruction is one of the key "push" factors that "cause students to drop out of school. Teachers are the most significant factor in educational quality provided they have sufficient recognition, preparation, support, resources, autonomy, and opportunities for continued development. With proper support, teachers can ensure effective, culturally relevant, and equitable learning opportunities for their students"; UNESCO (2021). The

professionalization of teaching is essential to supporting students in developing the full scale of skills required by the digital economy.

Importantly, this requires creating "a continuum to support the profession that includes selecting talented candidates, providing them with high quality and relevant initial preparation, supporting them effectively in the first years of teaching and with continuous professional development, structuring teacher jobs in ways that foster collaborative professionalism, making schools into learning organizations, creating teacher career ladders that recognize and reward increasing expertise either in teaching or in administration, and including the voices of teachers in shaping the future of the profession and of education", UNESCO (2020).

The creation of such a "continuum" requires "collective leadership so that these various components act in concert with one another. Many cultural norms undermine the professionalization of teaching such as the use of teacher appointments to serve interests other than those of the students – such as political patronage –, the use of teacher education programmes as 'cash cows' of the institutions that run them, career structures that do not recognize teachers' impact on student learning, lack of standards of practice or of standards for teacher preparation institutions, material conditions of the profession that are considerably below those of other occupations that require similar levels of preparation and work, pressures on teachers to perform work that diminishes their standing as professionals, such as demanding that they participate in political campaigns, or extracting mandatory financial contributions for causes not of their own free choosing or violations to their freedom, identities and human rights, including sexual harassment in the workplace, or coercion into religious or political allegiance", UNESCO (2021). Yet, as access to schooling has grown and the demand for teachers has expanded, there is a worrying regression worldwide in the share of qualified school teachers across ever level of education. "It suffices to note that the declining share of qualified teachers in sub-Saharan Africa is even more significant at the secondary level". As a matter of fact, only half of all secondary school teachers in sub-Saharan Africa possessed minimum qualifications in 2015.

Equally, down "from nearly 80% ten years earlier participation in technical and vocational education and training (TVET) for young adults also remains low in many parts of the world. Some progress can be observed in vocational educational enrolment between 2000 and 2020 in Central Asia, Central and Eastern Europe, as well as in East Asia and the Pacific with up to 15% of 15-24 years enrolled in TVET programmes. In the lowest income countries,

however, and in regions such as sub-Saharan Africa and South Asia, enrolment in TVET has remained low and stagnant at only around 1% of the age group. It is important to recall that vocational skills development is not restricted to formal education and training and that youth in the significant informal economies of many countries may have access to traditional apprenticeships or informal skills development", UNESCO (2021).

In line with the above, data from the International Labour Organization (ILO) indicate that "more than one in five youth (16-24) worldwide are not in education, training, or employment, two thirds of whom are young women", Ngu and Teneng (2020). These figures clearly reflect our collective failure to "ensure the universal right to education for all children, youth, and adults despite repeated global commitments since at least 1990. This is particularly true for girls and women, children, and youth with disabilities, those from poorer households, rural communities, indigenous peoples, and minority groups, as well as for those who suffer the consequences of violent conflict and political instability. Marginalized communities continue to be excluded by a combination of social, economic, cultural, and political factors. If education is to help transform the future, it must first become more inclusive by addressing past injustices. Factors that shape these inequalities and exclusions must be clearly identified if policies and strategies are to support marginalized students, especially those who experience compounded disadvantages".

2.1.5. Governance of the Education System

The strength of any education system reposes on its operational governance. In this light, the structure, on the one hand, and the extent to which goals can be attained are critical. On the side of the structure, research has shown that decentralized and or community models of education governance have emerged successful. This mode of governance has been existing in developed nations whereby the management of the education issue in the hands of the community. This is not the case for most countries of Central Africa of which Cameroon is part. As a matter of fact, the governance of the Cameroon education system has been underpinned by the centralized model. According Fonkeng (2009), the centralized model has fallen short of identifying and repairing real education problems. Today, the education system is in total dilemma as the confidence bestowed on its mission to equip learners with the right skills to face the 21st century job market has been dashed. It therefore follows that key variables of the education system such as policy design, programmes/curriculum, governance/policy

implementation, infrastructure and equipment and teaching methods constitute the specific variables under this study. Literature on these aspects will be seen below.

2.1.5.1. Policy Design

According to UNESCO (2015, 2018), policy is "a deliberate body of principles to guide decisions and rational outcomes". It is a statement of intent that is being implemented as a procedure or protocol. This signifies that the process of decision-making is for crucial organizational decisions, including identifying relevant programmes, action plans, and spending priorities to meet targeted goals in a particular domain is central to policy. Policy is a framework that drives every sector of a nation's development. However, focusing on a particular societal sector makes it more impactful, result evident, easy to analyse, and evaluation for possible amelioration. This is to say that policy must have a central of attraction or focus. This discourse permits us to examine the focus of existing digital education policy at the secondary education in Cameroon.

For the most part, ICT in education policy has always been mixed in national development plans. This makes it rigid and weak, hence lacking clear guidelines on its integration in the education systems. In this light, Yusuf (2005), using Nigeria as an example, explains that even though the Nigerian ICT policy document recognizes the importance of digital technologies in education, it does not make provisions for any vertical or sectorial applications in education. Instead, ICT in education issues were placed under the human resource development sector. This author further underscored that the sections 1-4 of this document relate to education with the following points: "to develop a pool of IT engineers, scientists, technicians, and software developers, to increase the availability of trained personnel, to provide attractive career opportunities, and to develop requisite skills in various aspects of ICT", UNESCO (2021).

According to Yusuf (2005), the policy document made mention of promising strategies, but lacked a specific application to education. This has often pushed key funding partners such as the World Bank and Africa Development Fund (ADF) to recommend sectorial application plans before disbursements ADF (1999). In addition, the author pointed out that the focus of the policy was on human resource development, which is highly job-driven and only prepares learners to seek for jobs rather than empowering them for job creation. Other researchers even advanced that what obtains in reality is more shocking as the focus in the classrooms is limited to learning about ICT, which is only "topicality".

In this light, Sharif and Hoff (2016) posit that ICT requires to serious implantation at the primary, secondary and higher levels of education so as to enhance skills for usability as early as possible. They concluded that the current policy formulation dimension seriously limits the potentials of learners to the central force of knowledge-based economic competitiveness. According to Culp, Honey and Mandinach (2003) poorly focused ICT policy for education as mentioned above limits its potentials as a tool for addressing challenges in teaching and learning, and as a change agent. The above discourse allows us to observe that learners need not learn about computers only, but for the development and management of teaching and learning, as well as developing skills for the current digital economy or the 21st century work environment.

Another important challenge to note, the ICT policy document of each nation is the lack of a professional strategy for teachers. Fonkoua (2007), Ndonfack (2015), and Tchombe (2009) corroborate this premise as they observed that professional development programmes for teachers in ICT is instrumental in the integration of ICT in education systems. In addition, Yusuf (2005) pointed out that digital education policies in Africa have failed to address the development of a "Nationally relevant context software for school use". This author observed that most of the existing software being used in the schools is imported. It is worth noting that Culp et al., in Malcam (2012) recommend the development of indigenous software to be used in schools.

In corroboration, Yusuf (2005) reveals that "none of the issues relevant to ICT application in the African education systems address the issue of research, evaluation and assessment" (p.319). Culp et al, (2003) underscore that "summative study, evaluation and assessment are crucial in ICT integration in schools". The literature reviewed also reveals that most of these "ICT policy document does not have a technology plan" (Yusuf, 2005). Lack of "a technology plan will result in a situation where ICT in education policy activities will be implemented haphazardly. As an ideal situation in developed nations", Selinger and Austin in Malcam (2012) made mention of "the existence of a technology plan alongside with ICT in education policy at school levels in United Kingdom and Northern Ireland. This is equally true in the European zone as the most recent was adopted by the European parliament in 2020", European Commission (2020).

The above explained digital education policy dimension is compounding in Cameroon as the aspects related to ICT in education are equally found in various policy documents, ministerial operational plans, non-governmental organization, and individual initiatives. In this

light, the main strategic policy documents with sections concerning ICT in education sector are: the National ICT development Plan since 2007, the growth employment strategy paper for 2009, and the National ICT strategic plan for 2016 - 2020. Looking at these documents we observed that a particular focus on ICT in education is limited.

Cameroon shares the consensus that ICT plays a vital role in bridging the gap between development and information, between developed and low-income countries, and between urban and rural communities. She equally understands that it is only through a solid policy environment that such a gap can be reduced. It is based on these premises that the country developed her first National ICT development plan in 2007 which was a cut-across policy instrument aimed at marking a significant presence of digital technology in every sector of the country's economy. This policy document is a "comprehensive framework for ICT development in line with following national development objectives: a framework for consultation and concerted action with private sector, civil society and development partners, a framework for coordinating government action and external support, notably from the Digital Solidarity Fund, The National Strategy for the Development of Information and Communication Technologies came along with a National Plan that identifies all actions programmed over the reference period 2008-2015, National ICT Plan" (NAICTP), (2007, p. 29).

This state of affairs in the Ministry of Secondary Education gives way to Engozo'o, Fozing and Mutia (2023, P. 21) to recommend the following to the various stakeholders involved:

- There is need for the harmonization of a technology policy for education at this ministry;
- The policy needs to be updated to meet the needs of the digital economy;
- The Ministry of Secondary Education should ensure schools have a plan for the infusion of ICT in the teaching-learning process;
- School managers are called upon to be effective and efficient in the implementation of education policy related to the development of skills for the digital economy;
- The ministry should constantly follow up to ensure that aspects of inclusion and lifelong learning are well considered in the process;
- The financing and /or provision of resources that enable the effective development of skills for the digital economy should be a priority in the ministry's expenditure. Among other key resources we have modern multimedia centres (well equipped), high bandwidth internet, sustainable energy;

- The ministry and schools should develop and multiply strategies for partnering with key stakeholders in the planning and implementation of technology policy for education;
- Continuous professional development in ICT pedagogic skills for teachers should be enforced;
- School managers should also be trained in e-governance;
- Sustainable management should ensure and enhance accountability and responsibility;
- The ministry should endeavour to align and engage with international ICT standards for education policy, in formulation, strategy and implementation respectively.

To talk of the education sector which is our concern, this policy concentrated on the development of digital skills under human resources development. The target here is to know the main modes of training used by education and training institutions to acquire skills in ICTs. The first is the pre-service training system which constitutes the formal educational system (from primary to higher education) which is required to provide adequate training in ICTs. This move was to anticipate the increasing digital skills in the nearest future. This was to overcome the inadequacies of the formal educational system and to meet current demands. As a result, many rapid training centres, of various calibres, have been set up and offer introductory courses to office automation and the Internet.

However, such training is most often tailored to individual needs to master the new tools. Also included was to train engineers and technicians through personal training, in-service training, and continuous education within a seven-year period. However, the policy mentioned in section 2.5.2.1 on education and research issues that a handful of initiatives as seen in chapter one has been undertaken to boast the ICT skills situation of the country, but Cameroon as a solid emerging economy within Central African Region was not making the expected progress.

The observation by this policy document is that it did not respond to the first dimension of an education focused digital policy as per this study. As outlined above, the education sector was rigidly mentioned in this policy document under human resources development. Though there is a section for education and training, which was both vertical and horizontal, (p.32), the document itself acknowledges that the given dispositions in this sector may not be able to guarantee an adequate training in the mastery and usage of ICTs by her citizens which is necessary to be competitive in the emerging global knowledge society. The policy design in this study focuses on the following core aspects:

- Existence of a relevant policy;

- Policy goals;
- Design of an implementation plan;
- Access, equity and inclusion;
- Partnership between the education planners and the business world;
- Monitoring and evaluation mechanism;
- Sustainability;
- SMART (Specific, Measurable, Achievable, Realistic and Time-bound).

2.1.5.2. Curriculum or Learning Content

The principal question to be answered by this variable is:
What programmes should be included in the curriculum design of secondary schools that will enable the development of 21st century work skills?

Changes to contemporary curricula are increasingly driven by the evolution of technology. The spread of digital devices and pervasive communication infrastructure has led to significant changes in the global society. These changes have highlighted the need for school to ensure that all students are prepared for the contemporary digital world. The need to equip secondary school students with digital skills means that digital technology can no longer be taught only as a core subject but rather needs to be embedded in all subjects across the curriculum.

In an attempt to respond to the above-mentioned question, this section of the study will explore how a number of countries have approached the integration of digital skills into the curriculum and the state of affairs in Cameroon.

International Curricula and Digital Technologies

At the international and regional levels, we shall briefly outline how the curricula of China, England, the United States and Kenya have been responding to rapid global technological changes.

a- China

Among the many goals of the eight wave of reform in the Chinese curriculum in 2011, was "to strengthen the relevance of curricula to students' lives, society and the development of science and technology" (Yin 2013, p. 332). The overall strategy became more flexible and devolved with a curriculum model across the three levels of nation, region and school (OECD 2013). In China, the use of digital technology has progressed in a very rapid rate, even more so

than in the other parts of the world (Chu 2008). As a result of this rapid growth, many teenagers may now be digital natives, but they are not necessarily digitally competent. The need for ICT in the curriculum was acknowledged by several publications of the Ministry of Education in the early 2000s, but further curriculum development is required in the area of digital culture (Li and Ranieri 2010). A national Development Plan for ICT in education was issued in 2012 and the current five-year plan for education aims for in-depth integration between ICT and education.

b- England

The English national curriculum was revised in 2014. This new curriculum replaced the previous launched in 2000, removing the previous ICT subject area and replacing it with a stronger focus on computing. With this new emphasis, the curriculum now focuses on the principles and concepts of computer science, alongside digital literacy and IT (The Royal Society 2017). This implies that computing is now taught in schools from the age of 5 to 16, with a focus on more application and development of tools, compared to just focusing on using them. The curriculum was developed for the recognised need for computational thinking and creativity to support learners in an increasingly changing world.

c- The United States of America (USA)

In the USA, there is no national curriculum. Each State decides its own. The US Department of Education first released a national Educational Technology Plan in 1996. This was updated every five years. In 2016, it was retitled as: “Future Ready Learning: Reimagining the role of technology in Education. In 2017, under the growing recognition that technology is changing too quickly to leave it for a five-year period, it was decided that there would be annual updates. This document outlines the vision for the use of technology in education across the U.S. and envisaged equitable, ubiquitous, collaborative use of technology, moving away from passive towards active use. Twenty-first-century competencies and both cognitive and non-cognitive competencies are emphasised. Equitable access and the digital use divide are highlighted as challenges that need to be overcome. One of the key recommendations of the document is to increase the digital literacy of pre and in-service educators.

d- Kenya

The Digital Learning Programme introduced in 2016 included digital devices delivered to students at the end of that year. All tablets were delivered with preloaded learning material for

Mathematics, English, Science and Kiswahili, with ICT integrated into the existing curriculum as a teaching and learning tool. To support this initiative, ICT skills were introduced in all school and professional development opportunities provided for teachers. The programme was accompanied by a strengthening of the country's internet and electricity infrastructure. The 2017 jubilee manifesto committed to transforming education and made ICT skills and digital literacy apriority in both primary and secondary education. The Kenyan current "Vision 2030" is aimed at making Kenya a knowledge-based economy and emphasised the need to prepare learners for the twenty-first-century skills needed to compete globally. As a matter of fact, this includes this includes the use of digital devices and digital literacy across all schools.

In the literature, "four main curriculum development models are usually identified: (1) Nkamta (2017) defines curriculum as a body of knowledge that focuses on content; curriculum is what is contained in the different subjects (Kelly, 2009). Emphasis is on the syllabus of the various subjects whose contents are transmitted to students and later evaluated. (2) Curriculum as a product, also known as the objective model. This aims to achieve a certain pre-planned and prescriptive end-product. The main features of this model comprise of situation analysis, identifying aims and objectives, choosing and organising content, selecting and organising learning activities and undertaking assessment. (3) Curriculum as a process; compared to the product model, the process model is more open-ended as it emphasises on a continuous process in which the result is the development of potential skills such as critical thinking (Sheehan, 1986). (4) Curriculum as praxis: This model emphasises on a broader view of educational practice in the society. Curriculum built on the curriculum as praxis model does not only include well-articulated plans; it also involves informed and committed action" Grundy (1987). In this model, the "focus is on continuous social processes – considered as human interactions, values and attitudes; put into practice by educators. This model, however, should not only be viewed as a set of plans to be implemented but should involve a thorough and active process in which acting, planning, and assessment exist in reciprocal and integrative relationship" (Yek and Penny, 2006).

e- Cameroon

The approach to "curriculum development and delivery in Cameroon is top-down". As a result of the top-down curricula approach, to understand how it is structured and operated, it is important to examine how the structures of the Ministry of Secondary Education extend to regional, Divisional and school levels. The ministry trains inspectors to undertake curriculum

initiatives. The trained inspectors ensure the effective running of schools by regularly inspecting schools through visits. The inspectors convey ministerial policies to regional delegates who in turn pass them on the sub-regional delegates. Head teachers are directly answerable to sub-regional delegates who also ensure that any issues affecting schools are relayed to the regional delegates. The minister takes full control of the acts of the ministry, the public and politicians (Forzie, 1990). The implication of this authoritarian approach is that any "change can only be carried out through the directives of the minister and as such, any changes are likely to become political. Consequently, the Minister of Secondary Education has full responsibility for curriculum development, curriculum control and the running of schools. Hence, curriculum implementation is often a one-sided process and any classroom feedback or teachers' input is unlikely to be incorporated in the curriculum development process" (Ibid).

Working, living and learning in the 21st century requires an expanded set of skills, competences and flexibilities. We must prepare for a continuous learning and reskilling process throughout our lives and career.

"This set of expanded skills has been the subject of research for over so many years today. However, the dramatical changes of our times have recently increased concerns on adjusting the skills set mechanisms required to cope with. It suffices to mention that education systems around the globe and in Cameroon in particular are navigating through a world of technological edge, called the fourth industrial revolution. Administrators, teachers, and learners are trapped at crossed roads, as rising costs, new economic models, technological transformation and aggressive competition constitutes the main challenges of the learning environment. To respond to these challenges in the expected manner, stakeholders are required to redefine the curriculum in secondary-high schools", Bernie and Charles (2009 p.3).

This problem is compounded in classical secondary schools in Cameroon as graduates are unable to transit to the job market/pick up their first job immediately upon obtaining their secondary school diploma. Worst of all is the fact that these graduates lack creativity and initiative skills to create jobs for themselves and the society in which they have the duty to contribute to its development, (Ngu and Teneng, 2020). Among key worries raised by (Njebakal and Teneng, 2017; Asongwe, 2018; Ngu and Teneng, 2020) we are in a knowledge age where by the nature of the work environment has dramatically shifted over time. As a matter of fact, the nature of the work environment has changed from the manufacturing industry

model to information-technology oriented. As a result, a key response by academia or education and training institutions should be to adapt the learning content to this new era.

To corroborate the above premises, Bernie and Charles (2009) developed a set of skills to be included in curriculum design in institutions of learning that have the mandate to develop the 21st century skills on its learners. According to these authors, the content framework or study programmes of colleges and state universities must include career and life skills either as a mainstream or a co-curriculum across every discipline. To Brandon (2016), career and life skills form part of the digital economy skillset and are crucial for every learning content that aims to prepare participants to excel in today's work environment. UNESCO (2020) talks in the same light as it explains that technology has completely changed the stakes of the work environment. It furthered that additional global cooperation is required through education, to leverage the current and future generations with 21st century life and career skills. According to Burning Glass/Business Higher Education Forum, the new foundation skills for the digital economy can be classified into three groups and 14 core skills. These three groups include:

i. Human skills;
ii. Digital building-block skills;
iii. Business-enabler skills.

According to UNESCO (2017), the skills for the digital economy can also be grouped into three, namely:

i. Basic functional digital skills;
ii. Generic digital skills;
iii. Higher level skills.

It suffices to mention that this study is examining the extent to which these skills can be embedded in the secondary school curriculum content of learning programmes. A general overview and evaluation of the secondary school curriculum is presented below:

Areas of Learning	Disciplines	Weekly load	Expected outcomes at the end of the 1st and 2nd cycles
1) Languages and Literature	Living languages: English, French, German, Italian, Spanish, Chinese, etc. ▪ English to Francophone learners ▪ French to Anglophone learners	10 (30%)	French and English, L1 Receptive skills: reading and listening Read in an autonomous way, different types of texts related to areas of life as defined in the syllabus; Listen and understand various texts related to the above-mentioned areas of life Productive skills: speaking and writing Produce various types of texts, of average length related to these areas of life; Language tools: appropriate use of various language tools in order to produce and read types of texts related to that level; Communicate accurately and fluently using all four basic skills in language learning; Be able to transfer knowledge learnt in class to real life situations out of the classroom; Be able to cope and survive in problem solving situations; Living languages II Receptive skills: reading and listening Read and understand simple texts on social life, citizenship, the environment, well-being and health, media etc. Listen and get oral information in order to simply interact during communication situations related the various domains of life. Productive skills: speaking and writing Sing, recite, dramatize, orally answer questions related to the various domains of life as defined in the syllabus; Write short passages on various familiar topics.

	Ancient languages: Latin, Greek National languages Literature Cameroon Literature; French Literature; Literature; Other literatures		Develop general knowledge through ancient languages and cultures; know the origins of the French language for linguistic mastery; Carry out elementary tasks in translation.
2-Science and Technology	Mathematics, The Sciences Computer Science	8 (25%)	Use mathematic knowledge skills and values with confidence to solve real life problems within the different domains of life; Communicate concisely and unambiguously and develop power of mathematical reasoning (logical thinking, accuracy and spatial awareness). The Sciences: Acquire the fundamentals of sciences in order to understand the functioning of the human body, the living world, the earth and the environment; Acquire methods and knowledge to understand and master the functioning of technical objects made by man to satisfy his needs; Demonstrate attitudes to protect his/her health and environment. Computer Science: Master the basics of Information and Communication Technologies; Exploit and use ICTs to learn.

Source: https://www.minesec.gov.cm/web/index.php/en/systeme-educatif-en/progammes-d-etudes-en.

Contextual Framework		Competences	Resources				
Families of Situations	**Examples of Real-Life Situations**	**Categories of Actions**	**Examples of Actions**	**Content Core Knowledge**	**Aptitude (Skills)**	**Attitudes**	**Other Resources**
Supply of Man's Needs in Animal and Plant Resources	Understanding Life and Life Forms	Appropriating Knowledge of Life and Life Forms	▪ distinguishing between living and non-living things; ▪ describing and explaining the scientific way of acquiring knowledge and solving problems; ▪ Creating observation charts and nature's calendars; ▪ constructing simple vivaria; ▪ communicating scientific information; ▪ Describing the differences between plant	Introduction to biology 1) Definition and branches 2) Relationship with other science subjects 3) Relevance to daily life 4) Characteristics of living things and differences between living and non-living things 5) Differences between plants and animals 6) Studying living things a) The scientific approach	▪ define biology and branches; ▪ explain the relationship between biology and the other sciences; ▪ describe and distinguish between biology related careers; ▪ the role of biological knowledge in solving daily life problems; ▪ Differentiate between living and non-living	Curiosity and sense of observation ▪ Respect of others opinions ▪ Interest in scientific advancement Open-mindedness ▪ Patience-Love for nature ▪ Team spirit and cooperation ▪ Decision making and critical spirit ▪ Creative thinking ▪ Logical reasoning ▪ Methodological action	▪ Didactic materials — charts, models, microscope, etc.; biology related fields, institutions, companies, Professional

	and animal cells; ▪ Distinguishing different types of cells as the origin and building blocks of life.	b) Observing living organisms (in their habitats and in the laboratory) i) Equipment/tools for observation (lens, microscope, the five senses, etc.) ii) Describing and reporting observations in biology c) The cell as the basic structural and functional unit of life. This should be strictly limited to the cell as seen with the light microscope (cell membrane,	things (animal/plant versus motor car/robots... etc.); ▪ how scientists investigate nature and/or solve problems; ▪ protect nature, life and life forms; ▪ observe, describe and appreciate the beauty of organisms in their natural milieu; ▪ communicate scientific information; ▪ distinguish plant and animal cells; ▪ appreciate the cell as	▪ Problem solving ▪ Management and respect for the environment ▪ Effective communication

		cytoplasm and nucleus only). i) Examples of types of cells to include plant and animal cells; reproductive and growth cells; bacterial and protoctist cells.	the origin and building blocks of life.
3) Social Sciences/ Humanities	History Geography Citizenship Education	6 (20%)	Possess cultural references to better locate events in time and space within a democratic system and become a responsible citizen. History: Acquire a common culture; be aware of heritage from the past and current challenges; Geography: Develop one's curiosity and knowledge of the world;

			Get acquainted with landmarks to find your way and fit in the world. Citizenship Education: Possess essential knowledge in rights and duties in order to fulfil his/her citizenship.
4) Personal Development	Moral Education; Home Economics; Sports and Physical Education Health Education	4 (15%)	Develop his/her physical abilities/skills; Get ready for physical challenges, save and regain energy after physical efforts; Identify risk factors; possess basic knowledge and principles in hygiene and health education; Demonstrate a sense of self control and appreciate the effect of physical activities. Conceive and draw up sports and cultural animation projects; Acquire methods and develop a high sense of efforts; Conceive, draw up and implement projects that will enable one to project his/her image and feel the well-being inspired by self-confidence.

5) Arts and National Cultures	Arts/Artistic Education; National Cultures	3 (10%)	Artistic Education: Observe and appreciate works of art; Carry out an artistic activity; Gradually acquire the love for personal expression and creativity; Possess a mastery of creativity in music, plastic arts and the performing arts. Dramatize, recite texts (poems, tales, proverbs, etc.) relating to various areas of society; Practise the different dramatic genres: sketches, comedy, tragedy, drama, etc. National languages and Cultures: Demonstrate a mastery of Cameroon cultures; Visit the various cultural areas of the country in order to discover their characteristics; Demonstrate a mastery of basic rules in writing Cameroonian languages as well as basic grammatical notions applied to these languages; Demonstrate a mastery of one of the national languages at 3 levels: morpho-syntax, reception and production of simple oral and written texts.
Cross Curricular Competences			
6) Cross curricula competences	Intellectual and Methodological domains		Solve Problem in a given situation; Use knowledge skills and values with confidence in order to solve real life problems within the different domains of life; With confidence, find useful information to solve problems he/she is faced with; Give his/her opinion; Support his/her opinion with strong arguments; Assess him/herself with a view to remediation; Demonstrate basic knowledge in note taking;

	Conceive and realize individual projects; Analyses and summarize information, give feedback and report orally or in writing. Develop problem solving approaches; Exploit and use ICTs in his/her activities.
Social and Personal Domains	Interact positively and assert his/her personality while respecting that of other people; Join team work, fit in a common initiative project/group; Demonstrate interest in cultural activities; Develop a sense of effort, love for work, perseverance in tasks or activities carried out; Understand and accept others in intercultural activities; Accept group assessment.

Source: https://www.minesec.gov.cm/web/index.php/en/systeme-educatif-en/progammes-d-etudes-en.

An important observation to make from the tables above is that every subject is important in enhancing the development of the skills required in the digital economy, but for the fact that subjects like computer science, and related hard sciences are directly involved. Also, the social sciences (economics and marketing or commercials are also directly involved). We can also deduce from the above table that the learning outcomes are defined in terms of equipping learners with the basics of skills amid that fact that this study expects secondary school learners to be able to pick up jobs or create jobs in the evolving digital markets. More will be elaborated at the level of analysis where this programme will be confronted with the core skills content of the digital economy.

Karsenti (2012) points out that, “issues related to the digital teaching-learning content in secondary schools in Cameroon have remained theoretical”. This author noted that core digital literacy skills such as assessing, evaluating, applying and managing information and using information source appropriately are not evident in classrooms in the towns of Douala and Yaoundé. This is happening at a time when we are surrounded by digital media and media

choices. According to the centre for media literacy, media skills, medial literacy skills provide "a framework to access, analyse, evaluate and create messages in a variety of forms, build an understanding of the role of media in the society as well as develop essential skills for inquiry and self-expression". In this context, media literacy refers to the medium used in delivering messages which include: print, graphics, animation, audio, websites, social media platforms. In this light, Teneng (2020) noted that "the ability to create web pages, graphics, animations, videos, games, visual communication, editing in documentary and videos, camera usage, selecting the right digital tool to use, and the appropriate communication method to be used constitute digital medial skills required in the 21st century work place. This author concluded that media skills should be associated with ICT literacy skills across the primary and secondary school curriculum in Cameroon".

2.1.5.3. Governance/Policy Implementation

The implementation of digital education policy towards the development of the 21st century work skills on graduates requires enabling strategies including adapted mechanisms in planning, organization, coordination, decision making, and application. UNESCO, (2017) holds that there is an important need for relevant and adapted governance strategies for embedding ICT in education systems. In this light, Bernie and Charles (2009) held that developing a successful digital economy education programme requires both distributed and coordinated leadership. These authors furthered that authority and decision making are crucial in educational administration, hence must be entrusted to expert hands, and that technology must be used to communicate and coordinate action efficiently. According to Njebakal and Teneng (2017), taking advantage of technology to transform learning requires strong leadership capable of creating a shared vision, of which all members of the community are part.

In the current context of massive digitisation and datafication of education, we can now see how new digital instruments are being mobilised to make educational policies (as well as other, more commercialized ambitions) operational. Such instruments are combinations of both technical and social components that ultimately partake in a shaping of the ways in which educational realities are seen, known, made amenable to intervention and acted upon—in the pursuit of improvement, accountability or discipline, and so on. The articles in this special issue emphasise how the technical aspects of instruments (the software, its code, algorithms and database architectures) and their social aspects (the organizations and actors producing them, their representations about education, their values and the discursive regimes framing them)

combine in the enactment of specific techniques of digital education governance (Williamson, 2016).

These studies, in combination with one another, demonstrate how digitized techniques of educational governance are now being performed by governmental, technical and commercial actors, through schools and universities, in classrooms, lecture halls, examination settings, online e-assessments and in professional sites of learning, and through specific coded devices, algorithmic forms of analysis and other data practices that are embedded in vast new data infrastructures for the creation and communication of knowledge about education. These developments register a structural shift in educational governance, from the formal organs of government to a more distributed range of commercial, international and non-governmental actors working in networks (Ball, 2012). New kinds of data actors, such as the analysts and data scientists at Pearson, the OECD, Ofsted and within schools and universities themselves are being brought into being; new data careers are available for specialists, or 'algorithmists', with the expertise to turn educational data into useful intelligence that might shape the decision-making of policymakers, influence the interventions made by educational leaders or the pedagogic decisions made by teachers or even shape the choices of parents and learners themselves.

However, new techniques of governing are also enabled by the specific affordances of the digital instruments they employ. For example, real-time digital data technologies make it possible to provide fine-grained assessments and analyses of individuals, and to activate interventions automatically within digitized classrooms, seminar rooms and online courses rather than through the bureaucratic organs of government. Schools' data dashboards make their progress visible, and can be used to hold them accountable. Policymakers may also be influenced by digital decision-support systems that augment human decision-making with automated data analytics capacities. Individuals, including learners at all stages, teachers, academics, educational leaders, examiners, inspectors and even policymakers themselves, are thus to be governed up-close by increasingly automated management machines that are programmed into existence in competitive commercial and international organizations—their actions, behaviours and comportment within education institutions shaped, enabled or constrained, ultimately, by the models and values programmed in to digital systems. Software and data companies and agencies are becoming dominant sites for the instrumentation of education.

To Teneng and Ngu (2021), the goal of digital governance in education is to embed an understanding of technology-enabled education within the roles and responsibilities of educational managers, and to set the ball rolling across the educational system. Therefore, educational leaders at all levels must firmly and consistently lead all stakeholders of the education community: students, parents, teachers, education administrators, government officials and policy makers towards learning goals that are rigorous and relevant to knowledge, understanding and proficiency in digital economy skills. However, despite the fact that digital governance is being perceived as a problem across the Cameroon education system, the case of higher education (state universities) is more preoccupying in this study. This is for the simple reason that education remains the main avenue for ensuring the development of core digital economy work skills on the population. As a result, the digital framework for the education sector must consider putting in place a strong implementation plan. It suffices to mention the purpose of digital policy governance before delving into its operationalization properly.

2.2. The Purpose of E-governance in Education

An education policy "remains meaningless if its governance or implementation is not clearly defined". According to Fonkeng and Tamanjong (2009), relevant strategies are required to be put in place so as to better drive education policy definitions. These authors explained that the job of educational administration is an art, hence must be carefully designed, and the right resources assembled for concrete actions. The complexity that accompanies digital policies requires it to be governed with tact as well. Policy governance has the following purpose:

- **Translating, describing or interpreting policy formulations:** The first stage in governance is for educational managers to make out a clear understanding of vision and goals in policy formulations. This task must be handled with care, for any error at this point will fail the whole process. To Howlette and Cashore (2014), policies are generally implemented through a well-established protocol which must begin with interpretation and understanding of the inbuilt ideology, orientations, goals, tasks and means. Since the domain of educational technology harbours notions that are sometimes considered scientific and complex to be understood by someone who has not received sufficient basic digital education, it is therefore an imperative for today's education leaders to get some training on the latter.

- **Structuring or policy ordering:** this is another important purpose of governance that involves the structuring or ordering of goals by their importance or by priority as determined by formulations. A digital policy that is destined to the development of digital work skills on secondary school learners therefore requires to be structured based on goals and priorities. This will be based on the type of digital infrastructures to be acquired, the skills content, and instructional methods to be used on different learners.
- **Identifying and laying down the procedures to be used:** one of the most important reasons for policy governance is to lay down the strategies that will be used in the execution of tasks. This falls in the works of Fonkeng and Tamanjong (2009) who explained that the strategies for goals realization are all embedded in the various leadership styles, amongst which we have: the bureaucratic leadership style, the democratic, the humanistic, the contingency leadership style.
- **Set standards, monitoring and evaluation mechanisms:** The success of every policy also depends on the standards, monitoring and evaluation framework established for work. These instruments are crucial in the aspects of quality control in the implementation process (UNESCO, 2017).
- **Organization and coordination of resources:** The question of managing resources is at the centre of digital policy governance in primary and secondary schools. The availability and management of digital infrastructures such as multimedia centres, internet, instructional platforms, and whiteboards will facilitate learning in general, and the development of skills for digital jobs on learners. Also to note is the importance of managing teachers and administrators to embrace the new dispensation of using ICT in their course preparation and delivery.

It therefore follows that policy implementation or governance has been described in this study in terms of:

- development of an implementation plan;
- decision-making;
- e-governance;
- leadership styles;
- transparency and accountability;
- sustainability (finance and maintenance);
- resource mobilisation;
- monitoring and evaluation.

2.2.1. Infrastructure / Equipment

According to WSIS (2003), “Infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all …” and calls upon governments “…to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services”. The commitment of policy on ICT infrastructure is essential for the development of digital economy skills has been the subject of heated debate on the integration of `technology in the classroom in this digital age. According to Karenti et al., (2009), the integration of ICT in the classroom in sub-Saharan Africa has as its principal obstacle, the 21st century digital infrastructure. In a Pan-African study carried in 2012 on the integration of ICT in the classroom, this author discovered that very few schools in Cameroon owned a computer laboratory for learning. They equally pointed out that, teachers and learners in particular require sufficient access to digital hardware and software before any integration can be considered effective.

UNESCO (2018) corroborates the above point as she indicated that the omnipresence of digital materials in all its forms and dimensions is crucial for today’s learning environment and the development of the skills for the digital workplace. She also lamented that the low presence of smart boards, multimedia centres in schools, and the absence of school-based learning platforms has unprecedentedly hindered their use in the teaching-learning process. In the same light, COL (2015) posits that ICT in education policies must focus on strong issues by promoting access to ICT and reaching specific ICT targets related to computers, computer labs and internet connectivity at educational institutions. In the case of Cameroon, the presidential gift of the “one-student one-laptop” project launched since 2017 has been termed by experts as laudable. However, the question of quality and sustainability is still begging for an answer as will be seen in the findings of this study.

Also, the question of multimedia centres in secondary and primary schools in Cameroon is also a heated debate in all its forms. According to Béché (2020), the absence of such centres in schools confirms the emptiness of the Cameroon educative system in the face of crisis like the Covid-19 pandemic. In connection to this, Akumbu, Teneng and Ngu (2021) indicated that the focus should go beyond multimedia centres to the creation of multimedia classrooms in all educational institutions. These authors advanced that learning can be more interesting, motivating, and easy in classrooms with smart boards, internet connectivity, and iPad or

computers for all learners. It therefore suffices to note that key equipment that are typical of a smart classroom include:

- **Interactive white board**: Also known as an electronic whiteboard, it is a classroom tool that allows for images from a computer screen to be displayed in the classroom using a digital projector or plasma screen. A teacher can teach any subject with touch-sensitive multimedia surface by using their finger, pen or stylus. Interactive boards help teachers in engaging students with visual media and modern lessons.
- **Projectors**: this is a portable solution that facilitates the conversion of any surface (whiteboards, existing projector screen, or surface walls). It helps teachers in assisting sessions during presentation, videos and other visual elements. This is successful when the projector is connected to a laptop or computer. The projector technology has however been replaced by the interactive LED/LCD technologies in most developed nations.
- **Interactive LED/LCD panels:** This is a large format touchscreen ideal for meeting rooms and collaborative spaces. It is a replacement for clunky or outdated technology that have high-quality display, enhanced connectivity, and built-in software solutions. Learners become motivated, and attentive when learning from interactive screens. It suffices to note that digital learning becomes fun when learning with 2D and 3D animations, videos, audios, and graphic presentations. A smart classroom, equipped with interactive LED/LCD helps teachers in planning their lessons around visual media.
- **Digital podium:** A digital podium can be defined as an advanced lecture stand that is squarely equipped with diverse media components which enables a fluent learning session. Some of these components include: speakers, amplifiers, microphones, microphones, keyboard drawers, integrated UPS for lecture recording and continues power supply support.
- **Speakers and Wireless Microphones:** With speakers in "the smart classrooms, there is no room left for questions like 'can you hear me back there?' Modern speakers ensure that teacher's voice is audible to the last row and no one misses out on important points. A wireless microphone eliminates dealing with long coils of wires" Béché (2020). They also let you be more mobile and allow you to be hands-free.

Apart from this hardware required in today's classroom, it is also imperative for digital strategies in secondary education to consider various software that can be used in the teaching-learning process from research, lesson presentation, and evaluations. Reference can be made

to the literature on digital teaching-learning methods for more knowledge on these applications. In a nutshell, little has been done on the crating of specific contextual software that supports learning in the Cameroonian context, except for importation of foreign built apps, that do consider our diverse cultural backgrounds.

Broadband internet in schools

In connection to the above, UNESCO (2016) explains that the availability of a strong broadband internet is critical for the existence and survival of online learning. In this light, Béché (2019) held that internet connection is required for any successful online interaction. It is not only necessary for connecting with learners, but for research by all to obtain information online. In this light, Karsenti (2009) contends that very few or no secondary schools have been noted to have internet connections to use in online learning. A report by the Ministry of telecommunication indicated that the affordability of internet by Cameroonians is a call for concern. In this light, Teneng and Ngu (2020) report that the section 8 of the 2019 finance law introduced taxes on software and application downloads outside of Cameroon at a flat rate of CFA 200 francs, equivalent to 0.34 United States Dollars per download. This is happening at the time when the current average cost per 1GB is CFA 2,000 (3.4 USD) per month. It also suffices to note the average wage is CFA 36, 270 per month. Recent reports by the world Bank on the poverty rate in Cameroon shows an increase from 24.5% in 2019 to 25.3% in 2021 (World Bank, 2021). What can be deduced from these statistics is that the cost of affording internet is relatively expensive for an average Cameroonian to strongly engage in research and online learning.

The question of steadily available electricity

Besides, the problem of electricity has been the highest obstacle for the smooth functioning of digital mechanisms in our schools. According to UNESCO (2017), electricity is of crucial importance in the facilitation of school activities and overall, significantly improves the learning environment. For instance, it provokes unnecessary cancellation of learning due to ill-lighted classroom, and poor power supply for computers, the internet and related learning tools. To corroborate the above, UNESCO statistics on schools' access to electricity depicts that 91% of schools in Cameroon still suffer from access to steady electricity, UNESCO (2016). In recent times, the problem of unsteady electricity has increasingly hindered the use of digital tools in the school milieu. It has even been observed that the national electricity supply company in Cameroon known as ENEO (The Energy of Cameroon) has recently resolved to

the constant rationing of power geographically. This has really slowed work, both in the offices, classrooms, and households that used technology.

2.2.1.1. Teaching Methods

One of the resolutions arrived at the world Education forum on strategies for leveraging ICT for Education 2030 pointed out that governments; through their education systems must established "policies to unlock ICT for quality and relevance of learning". Participants of this forum agreed as follows:

> *"We reaffirm that national ICT in education policies and strategies should focus on unlocking the potential of ICT to ensure that education institutions and programmes will be adequately and equitably resourced, including through cost-efficient Open Educational Resources(OER) and Massive Open Online Course (MOOC), equitable accessibility of ICT facilities and learning management platforms, and sufficient numbers of qualified teachers who are equipped with adequate ICT competencies and appropriate pedagogy."*
>
> UNESCO (p.5, 2017)

The above reaffirmation brings us to note that traditional classroom teaching was designed for another age, and that we are now in a different age that requires purely different methods. This key shift is towards greater emphasis on the 21st century skills, particularly knowledge management, work related skills in general and the digital economy in particular. In other words, we need design models for teaching and learning that leads to the development of the skills needed in the knowledge–based age or the digital age. The digital teaching-learning framework in this study is viewed in terms of e-learning teaching methods and teachers' ICT pedagogic competencies. This will be discussed in detail below.

In recent years, there have been a significant research and findings on course delivery methods that match the exigencies of the 21st century skill development. According to Karsenti et al., (2009), the omnipresence and omnipotence of technology in today's learning environment have disrupted the case teaching methods significantly. These authors further pointed out that the challenge is evident in classrooms in sub-Saharan Africa as there is still much work to be done in terms of digital policy and practice in education. However, several e-learning teaching-learning strategies are currently being used in classroom across the globe. What remains unfortunate is how different education systems accept to use them, and the extent

to which nations are ready to integrate them. An unending list of these e-learning teaching strategies exists, but this study will treat a few mostly under blended learning and online learning models.

2.2.1.1.1. Blended Learning

The traditional face-to-face, in-person, classroom-based, has been used for centuries as the ubiquitous delivery method. It is only in recent years with the technology revolution that distance learning or technology-enabled learning has become famous. According to the U.S. Department of Education (Means, Toyama, Murphy, Bakia and Jones, 2009), "a blended classroom and web-based teaching and learning offers access to the widest range of learning models and methods for developing students' skills". As almost all of us did a larger part of our learning in-person and classrooms, we usually refer to the combination of face-to-face and online learning as a special form of learning called "Blended learning". According to Bonk and Graham, (2006), "blended learning is part of the ongoing convergence of two archetypal learning environments. The simplest definition of the term blended learning is the use of traditional classroom teaching methods together with the use of online learning for the same students studying the same content in the same course. It is a thoughtful fusion of online learning experiences and face-to-face" (Garrison and Vaughan, 2008). There are also blended programmes in which students study some courses in face-to-face classrooms and others fully online.

According to Béché (2013), technology for learning has been readily available. This author posits that the importance of blending learning is now evident as it impacts for all actors on the learning environment is now causing a positive change in the development of skills for the digital economy. This is also because there is more clarity about how to use both in-person and online teaching or blending the two. This is equally based on many research findings on blended learning which shows an increase in learners' ability to learn collaboratively, think creatively, study independently and tailor their own learning experiences to meet their individual needs.

Blended learning can also be defined as a term applied to 'the practice of providing instruction and learning experiences through the combination of technology-enabled learning and face-to-face model. It suffices to note that during the technology-mediated component of these learning experiences, students are not required to be physically together in one place but may be connected digitally through online communities. For example, one blended course

could involve students attending a class taught by some teachers in a traditional classroom setting while also completing online components of the course independently, outside of the classroom, on an online platform. Classroom instruction time may be replaced or augmented by online learning experiences, and online learning experiences, can include varying degrees of interaction or just time alone in independent study and learning activities", Béché (2020). However, in a quality blended experience, the content and activities of both face-to-face and online learning are integrated with one each other and work towards the same learning outcomes with the same content. These various learning contents are synthesized, complement each other, and are planned or orchestrated to run in parallel.

2.2.1.1.2. Blended Learning Models

Blended learning can be divided into three (03) models.

- The ***first is the Blended presentation and interaction.*** Classroom engagement or face-to-face is the primary component, with online exercises as support from out-of-class. According to Hannon and Macken (2014), activities here focused on face-to-face sessions, blended with online resources.
- The second is known as ***Blend block model or the programme flow model*.** In this model, a sequence of activities, or "blocks" are designed to incorporate both face-to-face and online study, usually with consideration for both pedagogical goals and practice constraints. For example, the Ministry of Secondary Education has resolved to deliver online lessons on platforms for all the regions of the country. However, a follow-up in face-to-face have been absent in what is going on because the course is being prepared and delivered by teachers different from those who teach these learners physically. According to Hannon and Macken (2014), it is the combination of intensive face-to-face session as one day or half-day, weekly online tutorial/seminars for activities or interaction, online content and resources.
- The third is ***fully online*** but may still be considered blended "if it incorporates both synchronous learning that is real time tutorials and asynchronous activities for example, discussion forums". To Hannon and Macken (2014), "it involves short lecture podcasts with online resources and learning activities, online tutorials (synchronous), interaction via online, collaboration and discussion forums/ or group works".

2.2.1.1.3. Benefits of Blended Learning

Blended learning has the following benefits for both students and teachers:

- It increases the learning of digital economy skills, greater access to information, improved satisfaction and learning outcomes, and opportunities both to learn with others and to teach others.
- Opportunity for collaboration at a distance: Individual students work together virtually in an intellectual endeavour as a learning practice.
- Increased flexibility: Technology-enabled learning allows for learning anytime and anywhere, letting students learn without the barriers of time and location but with the possible support of in-person engagement.
- Increased interaction: Blended learning offers a platform to facilitate greater interactivity between students, as well as between students and teachers.
- Enhanced learning: Additional types of learning activities improve engagement and can help students achieve higher and more meaningful levels of learning.
- Learning to be virtual citizens: Learners practice the ability to project themselves socially and academically in an online community of inquiry. Digital learning skills are becoming essential to be a lifelong learner, and blended courses help learners master the skills for using a variety of technologies.

2.2.1.1.4. Online Model/Distance Learning

Online learning is increasing becoming the accepted mode of delivery in today's education. This is the same mode of learning that has been under stiff resistances by many didactics' experts on the grounds that the absent of the physical classroom drama and the human touch reduces assimilation. According to Djeumeni-Tchamabe (2007), the slow rate of integration of online learning in African education systems has been hindered by too much belief and attachment to the traditional face-to-face model. Before today, graduates with online degrees have often been rejected by the education system based on the image alluded to this mode of learning.

It was until the 90s and 80s that the importance of online learning became evident. In this light, Akumbu, Teneng and Ngu (2021) explained that the unprecedented presence of ICT in the classroom in the current generation is inevitable. This author however warned that the Cameroonian education system was quite lagging. In the same light Béché (2020) opined that the ushering of the Covid-19 has exposed the Cameroon education system in terms of low digital readiness, which is considered absurd in the age of digital boom.

According to Dahan (2020), distance education can be defined as "the teaching and education arrangements in which the learner and the teacher are separated by geography and time. For learners, distance education is a means for accessing learning and balancing work and education responsibilities". For employers' distance education is a means of offering high quality and cost-effective professional development for them to upgrade their job skills. UNESCO (2002) contends that "distance learning is a medium through which they can reach citizens with limited access to conventional education or training, ensure there is connection with educational institutions, curricula, and emerging network information resources, and medium for promoting innovation and opportunities for lifelong learning".

Some characteristics of distance learning are:

- Separate teachers from learners during the instructional process. Meaning that the human touch that exists in the conventional classroom is absent.
- The use of technologies such as laptops, iPad, smarts, learning applications, and the internet are paramount.
- It can be synchronized or asynchronous learning
- It allows for a two-way communication between the tutor and the learners, and sometimes among a larger number of peers.
- Learners can access from anywhere, an anytime(asynchronous)

2.2.1.1.5. Teaching Strategies with Online Learning or Distance Education

i. Online Collaborative Learning

The frequent use of the constructivists approaches to learning and the development of the internet has led to the invention of a particular form of constructivists teaching, originally called computer-mediated communication (CMC) or network learning. However, Harrison (2012) now calls it online collaborative learning model (OCL) of which according her:

> *"OCL theory provides a model of learning in which students are encouraged and supported to work together to create knowledge: to invent, to explore ways to innovate, and, by so doing, to seek the conceptual knowledge needed to solve problems rather than recite what they think is the right answer. While OCL theory does encourage the learner to be active and engaged, this is not considered to be sufficient for learning or knowledge construction……In the OCL theory, the teacher plays a key role not as a fellow-learner, but as the*

link to the knowledge community, or state of the art in that discipline. Learning is defined as conceptual change and is key to building knowledge. Learning activity needs to be informed and guided by the norms of the discipline and a discourse process that emphasizes conceptual learning and builds knowledge".

(Harrison, 2012 p. 9)

This online method mostly uses Learning Management systems and the internet to enable participants to follow multiple discussion topics. It also uses LMS like Google classroom and Moodle to use a scaled-down approach to give teachers what they need to communicate with students, organize class events and materials, and keep records. It is a form of asynchronous learning that saw a rise in its use at the all state universities in Cameroon at the peak of the Covid-19. In this method, the teacher remains a moderator and controls the online discussion in three stages which are:

- Idea generation with the discussion group;
- Idea organizing: this is where learners compare, analyse and categorise the different ideas previously generated, again through discussion and argument;
- Intellectual convergence: the aim here is to reach a level of intellectual synthesis, understanding and consensus (including agreeing to disagree), usually through the joint construction of some artefact or piece of work, such as an essay or assignment.

However, the role of the teacher or instructor in this process is seen as critical, not only facilitating the process and providing appropriate resources and learner activities that encourage this kind of learning, but also as a representative of a knowledge community ensuring that the core concepts of the subject domain are fully integrated into the learning cycle" (Harrison, 2012). The collaborative learning is not aimed at replacing the teacher, but "to use the technology primarily to increase and improve communication between the learners and teachers". It therefore has a particular focus on the development of learning based on knowledge construction, assisted and developed via social discourse. The discourse is not random, but managed in such a way as to scaffold learning by: assisting with the construction of knowledge in ways that are guided by the instructor; that reflect the norms of the discipline; that also respect or take into consideration the prior knowledge within the discipline. Some main benefits of this method are:

- When used appropriately, online collaborative learning can lead to deep, academic learning or transformative learning;
- The asynchronous mode offers more flexibility to professionally engaged learners;
- It also supports the development of higher thinking skills like critical thinking, problem solving, initiative and innovation which are key for learners to sail though the digital job market.

However, one of its main limits is that it cannot take many learners at a time since the facilitator or moderator needs to work closely on idea generation, organization, convergence and application.

ii. Competency-Based Online Learning

Competency-based learning often begins with the identification of specific competencies or skills, and enables learners to master them based on learning resources: mechanisms, activities, and mentors. For the most part, competency-based leaning has often been realized through the face-to-face model. However, there has been a significant shift in recent years, with increased developments in technology and online learning, and given that most of the skills required in the digital economy is technology related. In this mode of learning, competencies are defining at different levels for learners to take on higher skills if the master lower ones. In a programme to master the Microsoft word skills for example, several skills may be defined and graded from lower to upper ones. These can be said to be in order from 1 to 10 as follows:

Microsoft word skills according to the Zety blog.

https://zety.com/blog/microsoft-office-skills accessed on 04/01/2022.

G1- Page setup

G2- Text formatting

G3- Editing

G4- Creating templates

G5- Textboxes

G6- SmartArt

G7- Quick Access

G8- Title and ribbon bar

G9- Spellcheck

G10- Grammar check

These skills are defined and designed into courses to be taken by learners mostly online. According to Teke (2012) skills such as those of Microsoft pack are basic skills that should be included alongside every programme at the secondary schools. This author however encourages on the presence of these skills in general education in particular. The successful development of these skills will require more of project-based and problem-solving strategies. However, two key aspect that must be taken care of in the competency-based method is the availability of learning support for learners, and online assessment which sometimes is based on the realization of task or project: designing a brochure, building a template, performing a satisfactory editing or setting up a page, but to name these few.

2.2.1.1.6. Teachers' ICT Skills Framework

The development of skills for the digital economy on students requires that every stakeholder intervening in the process should also be skilled differently. These stakeholders include educational managers, teachers, students and parents. The teachers' skills framework is being discussed below based on each stakeholder.

To begin with, in all success transformation in the educational environment, professional development of both old and new teachers should be a priority for policy. In order to consider as a digital economy teacher, teachers themselves need to break away from the old ways. According to Bernie and Charles (2009) whether a teacher is fresh or old, they must be learning to develop their design, coaching, and facilitation skills to guide and support learning projects for their students. It therefore suffices to note that teachers must continually sharpen their skills at using the powers of learning technologies to develop the skills for the digital economy. According to UNESCO (2017), ICT for education policies must include teacher's professional development programmes with a shift toward a 21st century model. A model that includes practice in designing and implementing inquiry, design and collaborative learning projects. In the same light, Akumbu, Teneng, and Ngu (2021) explains that the poor handling of online learning in higher education in Cameroon during the Covid-19 break is a clear indication that university lecturers are quite lagging in terms of digital economy teaching skills.

2.2.2. Skills for the Digital Economy

According to Burning Glass/Business Higher Education Forum, the new foundation skills for the digital economy can be classified into three groups and 14 core skills. These three groups include:

i. Human skills;
ii. Digital building block skills;
iii. Business enablers.

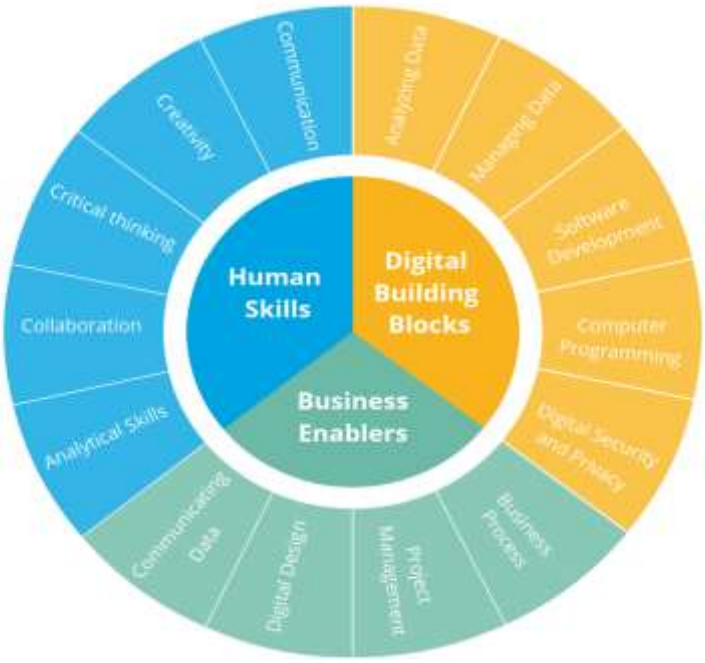
These skills are explained in details on the table below:

Table 14: Foundational skills for the digital economy (Source: adapted from Business Higher Education/ Burning Glass: https://www.bhef.com/publications/new-foundational-skills-digital-economy-developing-professionals-future)

Human skills	Digital building block skills	Business enablers
Critical thinking	Data analysis	Communicating data
Creativity	Data management	Digital design
Communication	Software development	Project management
Analytical skills	Computer programming	Business process
Collaboration	Digital security and privacy	

The graph below summarizes New foundational skills for the digital economy according to Business Higher Education and Burning glass.

Graph 10: Foundational skills for the digital economy (https://www.bhef.com/publications/new-foundational-skills-digital-economy-developing-professionals-future)



According to UNESCO (2017), the skills for the digital economy can also be grouped in three groups, which are:

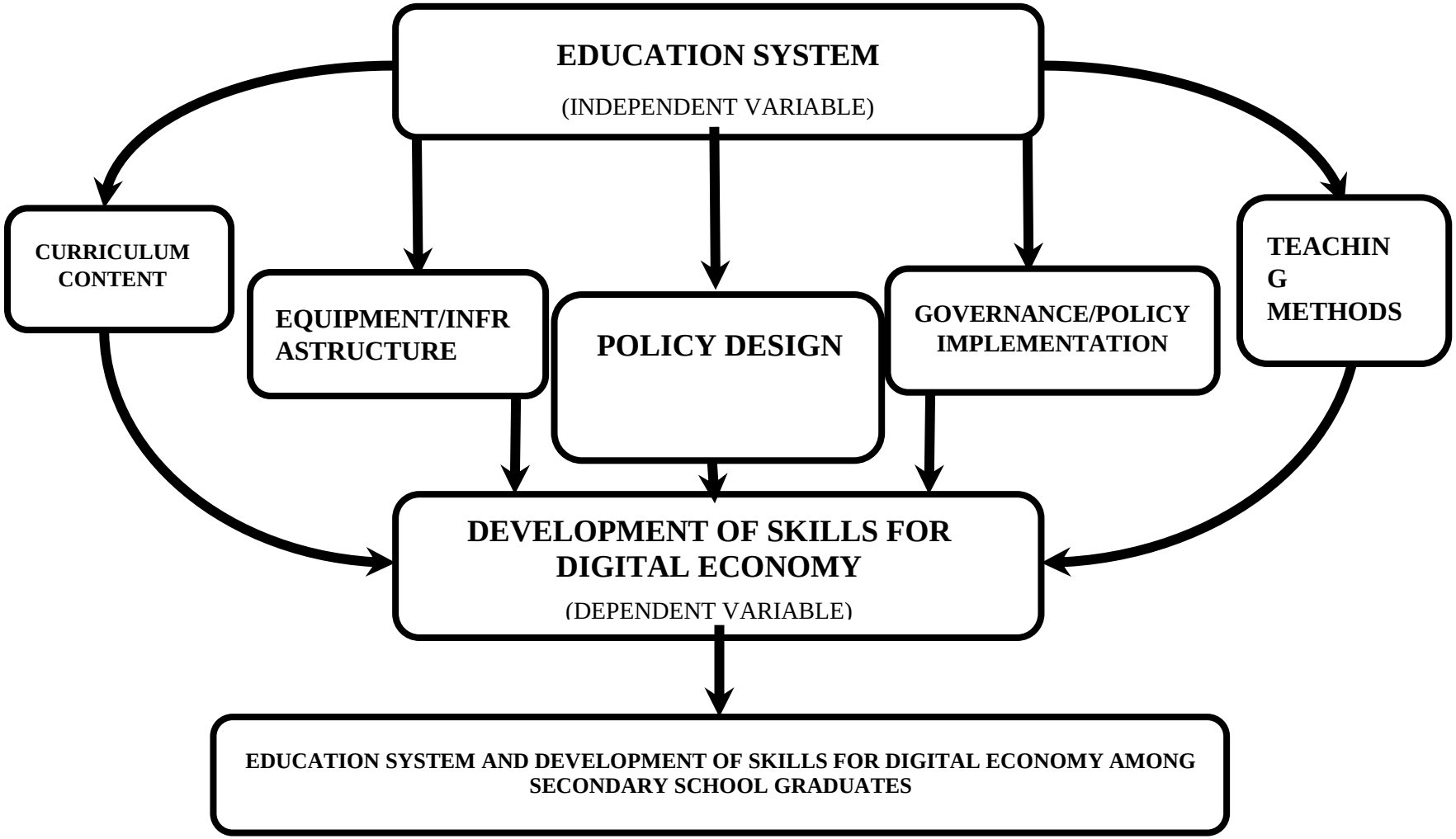
i. Basic functional digital skills: accessing and engaging with digital technologies;
ii. Generic digital skills: using digital technologies in meaningful and beneficial ways;
iii. Higher level skills: using digital technologies in empowering and transformative ways.

To mention the state of these skills in the Cameroon context, the "Cameroon digital economy assessment for 2020 notes that Information, Communication, and Technology (ICT) is in the official curriculum of basic education, but infrastructure is limited, and the quality is low, and is evident in key areas like:

- general secondary and secondary schools;
- vocational training and university courses;
- all areas of training to produce digital experts;
- digital transformation administration and companies;
- strong political will and market demand for digital skills".

The same report explains that "80% of schools in Cameroon do not have the infrastructure necessary to host ICT classes; that secondary education offers limited training opportunities for digital skills; that digital training has low student retention rates; that there is lack of programmes aimed at producing specialized digital skills; scarce digital skilled labour force; that there is a wide gap between skills and labour market needs; and that there is no national programme on digital skills development". It therefore concludes that the state of developing digital economy skills in Cameroon is yet to be established.

Graph 11: Conceptual framework of the education system and development of skills for the digital economy (Researcher, 2023)



2.3. Related Literature or Literature Gaps

The integration of digital technology in education systems and in the classrooms in particular has been a heated debate for policy, research, and practice. Hence, establishing the link between digital education and digital economy skills has been an interesting part of this debate. In this vein, it suffices to remark that schools are scrambling to gear up to the digital age by strategizing, and increasing the amount of technology in their classrooms in order to better prepare students for the evolving world. In this light, the COL (2021) opines that digital education policies in Africa must address the nature of thinking, learning, and acting with technology. It further insisted on the fact that an inevitable focus for policy must be to engage in how the learning process and cultures are changing; how quality learning and teaching are possible with technology, and how the overall educational systems will be transformed through digital technologies. In the same vein, the Qingdao statement of 2017 asserted that:

> *"To achieve the goal of inclusive and equitable quality education, lifelong learning by 2030, ICT-including mobile learning, must be harnessed to strengthen education systems, knowledge dissemination, information access, quality and effective learning, and more efficient service provision".*
>
> UNESCO (2017, p.3).

To Béché (2019), institutional strategies by educational institutes are required to gear up to the exigencies of the digital age. This author confined that there is a weakness at the level of ICT policy design in higher education in Cameroon towards the development of the skills of the knowledge –based economy. To Best and Dunlap (2012), the rational for every digital learning that aims to develop workplace skills must consider three main goals which are:

- The usage of digital technologies to support students with the skills they need to participate in a knowledge economy;
- Harness digital technologies to advance educators effectiveness and promote student achievement.
- Take advantage of digital technology to support educational access and equity.

The above studies indicate in various dimensions the link between the education system and the preparation of learners for digital working environment. However, the key issue identified by

these writers mostly focuses on access and equity to digital learning mechanisms. These aspects fall in line with the policy issues raised by this study but for the fact that their studies mostly concentrated on classroom practice, which is slightly different from this work which covers both policy and practice of ICT in HE. As a matter of fact, this study investigates policy in terms of formulation, implementation and evaluation.

Another key issue is that most of these authors simply looked at the integration of ICT in the classroom without a clear focus on the development of digital economy skills. This is a literature gap as to the present study which has a clear focus on the development of digital economy skills on secondary school learners. According to the 2030 Agenda for sustainable development, the fundamental mission of every educational system should be to prepare learners for the today's labour market (UNESCO, 2015). To this, Teneng (2021) posits that a primary indicator of this success is economic self-sufficiency.

In a study on developing 21st century entrepreneurial skills on learners in Cameroon, this author realizes that there existed no related self-reliance skills in the programmes offered by the schools, neither were the teaching methods and tools used in their education and training tied to. It suffices to note that this author worked particularly with graduates operating in secretariats and cyber-Cafes who fall in one of the digital economy skills set known as "digital business enablers". This study questions the commitment of the education system not only to access and equity in educational technologies, but the learning targets defined to be achieved through technology.

In consonance, (Fonkoua, 2012; Tchombe, 2012; Ndonfack, 2015), found in various studies that the lack of digital skills on teachers constitutes a key blockage in the integration of ICT in the classroom. The meaning of appropriation as defined by Béché simply means cultivating the spirit and effectively using ICT at all levels of the learning process. However, this begs the question to what extent have teachers been prepared to master the digital economy learning environment? This constitutes a key difference from the works of the above authors, who failed to evoke digital economy skills questions that await teachers in today's classrooms. This aspect is being addressed by this study as it asserts that the development of digital economy skills requires teachers to first of all have these skills, whether as novice or the experience.

In connection to the above, Njebakal and Teneng (2017) carried out a study to ascertain the skills set required by graduates to easily navigate into the world of work upon graduation. These authors were particularly interested in the teaching methods and the programme content delivered by colleges and faculties towards the preparation of these learners for an uncertain future. They found that, programme contents and methods used in classical faculties are theory inclined, and offers no avenues for internships, or practice. They also realized that core ingredients of the knowledge-based economy were not included in the study programmes.

The focus by the above writers aligns with some aspects of the current study in terms of the problem to be resolved which is digital practice on programme content design and digital teaching-learning methods. However, this study examines programmes in terms of 21st century skills ingredients and the design by teachers for online platforms. It is therefore important to note that this study is looking at the content ingredients to be strictly those of the 21st century workplace, and the manner in which these contents are embedded in the study programmes of these faculties. According to Teneng (2020), such contents could be included in the form of co-curriculum in all the programmes of faculty learners. However, this debate will be more interesting at the discussion chapter of this study.

2.4. Theoretical Framework of the Study

This section reviews the related theories. These theories have been developed on the basis of their relationship to the education system and the development of skills for the digital economy . They encompass: (i) the Experiential Learning Theory (ELT), (ii) the Technological Pedagogical Content Knowledge (TPACK) framework on learning outcomes, (iii) the Unified Model of the Human Capital Theory for the 21st Century Industry, and (iv) the Signalling Theory.

2.4.1. Experiential Learning Theory (ELT) and Design Models

Experience is the teacher of all things (Julius Caesar)

The only source of knowledge is experience (Albert Einstein)

We don't learn from experience...we learn from reflecting on experience (John Dewey)

Over the years many authors have delved into experiential learning, but John Dewey (1936) and David Kolb (1984). The works of these authors have been adapted to present day classroom

by recent authors (Bates, 2015; Teneng, 2020, 2021; Ngu and Teneng; 2020; Asongwe, 2021). According to Bates (2015), the Simon Fraser University defines experiential learning as:

> "*The strategic, active engagement of students in opportunities to learn through doing, and reflection of those activities, which empowers them to apply their theoretical knowledge to practical endeavours, in a multitude of settings inside and outside of the classroom".*
>
> (P. 99).

Experiential learning is based on "the notion that understanding is not a fixed or unchangeable element of thought and that experiences can contribute to its forming and re-forming. It is a continuous process and implies that we all bring to learning situations our own knowledge, ideas, beliefs and practices at different levels of elaboration that should in turn be amended or shaped by the experience – if we learn from it. He developed the Experiential Learning Theory, (ELT) in order to explain the connections between the human developmental stages of maturation, learning processes, and experiences". He believes that experience shapes the way learners grasp knowledge, which then affects their cognitive development. Experiential Learning theorists hold that knowledge is not static but dynamic, evolves and gets constructed and re-constructed as it seeks to interact with the external content and context. The continuously cycling model of learning that has become known as the 'Kolb Learning Cycle' requires four kinds of abilities or undertaking if learning is to be successful. (Teneng, 2018). Kolb as cited in McLeod, (2017) experiential learning suggests four stages as follows:

- **Abstract conceptualization:** This is a time for planning and brainstorming strategies for success. Once we have identified and we understand the defining characteristics of an experience, we can decide what we will do differently next time. An example can be seen in how we could plan to use ICTs in the teaching/learning of a lesson of any kind at the university. This can be done via researching and designing our courses to teach online or in a flipped classroom.
- **Reflective observation:** We need to reflect to successfully learn from our experiences. This is what the reflective observation phase of the experiential learning cycle is all about. It is during this stage that we consider and ponder

experiences. What went wrong and what could be improved. It is a chance to observe how it could have been done differently and to learn from others.

- **Concrete experience**: It describes the hands-on personal experiences that we learn from. It is where we try new things, get stuck in and step out of our comfort zone.
- **Active experimentation**: This is the phase of the learning cycle where we get to experiment with our ideas that is, time to put our plan of action to the test in the real world because if we don't, we won't know if it works.

Kolb (2005) describe the above as "a process of constructing knowledge from a creative tension among the four learning modes that is responsive to contextual demands".

Applying experiential learning in this study brings us to note that proponents of this model are highly critical of the possibility of embedding learning in real world examples. However, this is an understatement, as there are contexts in which online learning can be used to develop digital economy skill effectively. In this light, Bates (2015) explains how it works in both blended learning and a pure online learning as seen below:

a) **Experiential learning versus blended or flipped classroom:** here, learners can conduct research using online media resources to design or create reports and presentation. They will then collaborate online via group projects, discussions, and critical evaluation of each other's project. Face-to-face sessions are organized to evaluate, correct, exchange and practice what has been conceived online.
b) **Experiential learning versus fully online:** In recent years, educators are increasingly realizing that experiential learning can be applied totally online. This is being realized through a combination of synchronous tools such as web conferencing, through the use of Google classroom, Google meet, zoom and asynchronous tools such as social media (WhatsApp, Facebook, discussion forums, e-portfolios and multimedia for reporting and remote labs for experimental work. It should however be noted that there are circumstances where by real world experience is impractical, too dangerous, and too expensive. The case of flight simulators has been used to train commercial pilots, thereby reducing time and cost to practice on a real aircraft. However, there are many experiential design models that

secondary school teachers are encouraged to use, that can easily develop digital economy skills as briefly examined below:

i. The laboratory, workshop or studio design

This is almost a neglected area in our classrooms today. However, the ushering in the professionalization of secondary education as announced before could serve as an opportunity to effectively develop laboratory classes not only for science and engineering students, but to the social sciences and humanities as well. It therefore suffices to note that this design is quite important for many forms of trades or vocational training, but equally considered critical for the development of creative arts and entrepreneurship skills. This design serves the following functions:

- it gives students hands-on experience in choosing and using common scientific, engineering or trades equipment appropriately;
- it develops motor skills in using scientific, engineering or industrial tools or creative media;
- it gives students an understanding of the advantages and limitations of laboratory experiments;
- it enables students to see science, engineering or trade work 'in action';
- it enables students to test hypotheses or to see how well concepts, theories, procedures actually work when tested under laboratory conditions;
- it teaches students how to design and/or conduct experiments;
- it enables students to design and create objects or equipment in different physical media.

It is worth noting that the 21st century classroom has become a laboratory whereby learners are called upon to carry out tasks towards the realization of projects. This can be online or technology-enabled onsite. The development of digital economy skills on learners of the social sciences and the humanities actually requires some degree of laboratory experiments. This is a core skillset that every job position demands in the digital job market.

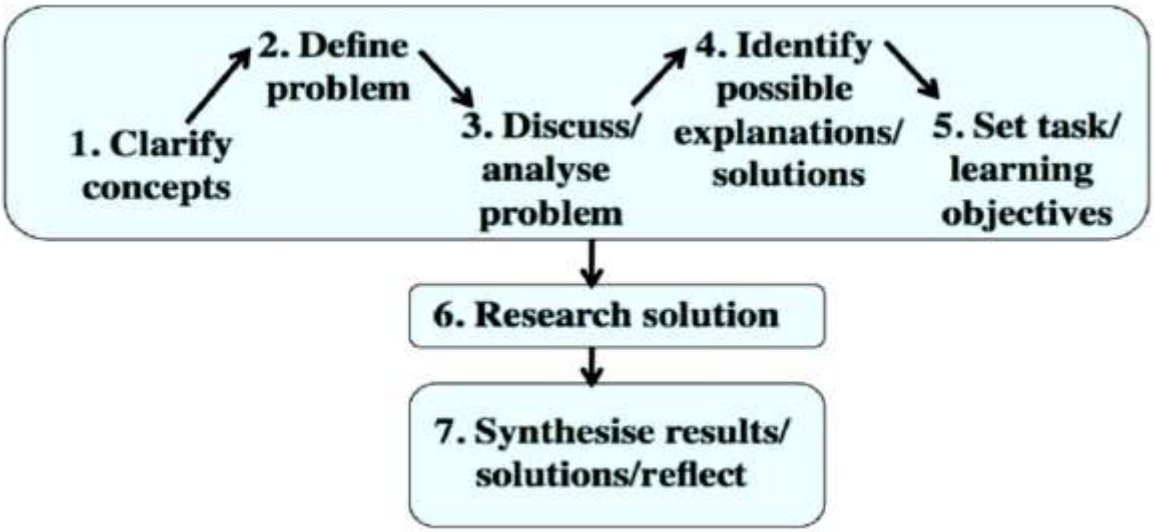
ii. Project-Based Learning (PBL)

Project-based learning is critical for the development of digital economy skills on secondary school graduates. It is a model of experiential learning that prioritises students' autonomy and responsibility in planning, work organization, and deciding on what resources and methods to be used in realizing their projects. Realizing a successful marketing page online for advertising online by a secondary school student for example is a digital economy skill that requires the use of the PBL model. This is based on the fact that projects usually rest on real world experience. The role of the instructor is paramount in this method as he decides the guiding question and plays a more active role in leading the learners through. It therefore suffices to note that there are various best practices and guides to a successful project work. In this light, Larmer and Mergendollar (2010) holds that every good project must meet two criteria:

- Learners must view the project work as personally meaningful, beneficiary, motivating for them to give in their best.
- A meaningful project fulfils an educational purpose.

The steps to realize a good work project was developed by Gijeselaers as cited in Bates, 2015) are as follows:

Graph 12: The Maastricht Seven-Jump Method for PBL tutorials derived from Gijeselaers (Bates, 2015).



However, the problem with this design is that some projects require a long term to be implemented, which gets learners lost in the process. In this vein, Strobel and Van Beneveld (2009) found that PBL is for long term retention of content, and development of replicable skills as well as enhancing learners' attitude for further learning.

iii. Inquiry-Based Learning (IBL)

IBL is critical in developing digital economy skills on learners. In IBL, the learners are more autonomous and responsible as the role of the instructor is quite limited. Here, the learner explores a theme and chooses a topic for research, develops a plan, and determine the research tools, before engaging in the process. The writing and defending of research works in universities is a typical IBL. However, it is only done with technical and science students. According to Banchi and Bell (2008), learners are expected to go through the different stages of inquiry in order to produce a satisfactory outcome. These levels include:

i. **Limited/Confirmation Inquiry**: Students confirm a principle through an activity when the results are known in advance.
ii. **Structured Inquiry**: Students investigate a teacher-presented question through a prescribed procedure.
iii. **Guided Inquiry**: Students investigate a teacher-presented question using student designed/selected procedures.
iv. **Open Inquiry**: Students investigate questions that are student formulated through student designed/selected procedure.

(Banchi and Bell, p. 27)

However, despite the advocate by most scholars for the use of Experiential learning to develop the needed skills in a digital age, there has been some criticism on ELT. For instance, Kirschner, Sweller, and Clark (2006) argue that it is difficult to guide the learners through a project realization of a project, and that it is very costly to obtain the equipment resources for the laboratories and workshops. It is judicious to note that instructors need well-tailored training to better handle EL teaching.

iv. Blended Learning Models

The integration of technology in the classroom takes on several forms, and is context-inclined. That which has been used as gold standard one for decades is the "Blended Learning" model. According to Bonk and Graham (2012), the ongoing convergence of traditional face-to-face, in-person, classroom-based teaching and learning have become the ubiquitous delivery method. Hence, it is inevitable to delve into the development of the digital economy skills without putting in place the required blended systems. It also suffices to mention that there are different types of blended learning to meet various learning objectives; this is to say blending from a physical classroom is not the same as blending from purely online. However, many theories to support BL exist, but only two will be reviewed here, then several models of BL will be highlighted as seen below:

i. The Complex Adaptive Blended Learning System (CABLS)

This model puts the learner at the centre, but allows all components to interact with each other. According to Wang et al. (2015) this model has six elements which are:

- **The learner:** the role of the learner's changes or adapts as they engage for the first time in new ways of leaning with technology-enhanced tools. They emerge from the passive role in traditional classrooms to a full active learner. This is critical for the support lifelong learners, and the net-general as a whole, a characteristic identified as important in the 21st century environment.
- **The teacher:** the "assumption here is that teachers engaging in blended learning will adapt to pedagogies appropriate not only for BL but for learners preparing to engage productively in 21st century societies, which is characterized by hi-tech, information-based and knowledge-based" Béché (2020). Also, the role of the teacher evolves to adapt with that of the learners and other elements of the system. Teachers are referred to as facilitators, mentors, advisors and moderators.
- **Technology:** technology is seen here as part of the BL system, and includes all elements working in relation to each other. In most cases, technology constitutes the means via learning material have been obtained (online library), used in the preparing of lesson (computers, and software), and the means through which delivery takes place (projectors or SMART boards).

- **Content:** subject matter is an important component of the CABLS. This is the material element used to engage the learners in the process of skills development. The interactive, dynamic, media-rich material available online creates opportunities for participants add content before, during, and after the lesson. The choice of the content is significantly determined by the dynamic between the learners, teacher, technology and the institution.
- **The learning support:** According to Wang et al. (2015), learner support refers to: "Academic support focusing on helping learners to develop effective learning strategies, such as time management and collaborative skills, and technical support aiming to help students improve their knowledge of the technological tools and the fluency with which they use the tools to complete specific learning tasks" (p. 384).

[2]Also, support can involve technologies troubleshooting, material access and learning to communicate effectively online. Few examples include well-designed LMS; easily build content, the internet, communication media, games, videos, but to name these few.

- **The institution:** Just as classroom-based learning requires buildings, desks, lighting and other accessories of brick-and-mortar institutions; blended learning requires technological infrastructure and digital janitors. Institutional support is a necessary if not sufficient condition for successful blended learning.

This BL framework is a square for this study as the availability of these components and its effective use in state universities is a guarantee for the development of digital economy skills on learners. According to Wang et al. (2005), a well-designed CALBS facilitates deep learning, and allows someone new to blended learning to use the key interaction of these components to achieve the expected learning outcomes.

ii. The Community of Inquiry Model in Blended Learning (COI)

His model describes the necessary elements to realize a deep and meaningful learning. This framework identifies the education experience as happening at the convergence of three presences: cognitive, teaching and social. This can be viewed in relation to today's learning environment as critical thinking, creating awareness by considering the social, emotional and physical characteristics of the learning environment. Working in groups in context of their learning is key

to this model, Rodgers and Raider-Roth, (2006, p. 1). It is an inspiration of ELT of Dewey (1936) and Kolb (1984). However, in keeping with the three presences of the COI model, (cognitive presence, teaching presence and social presence), this model creates opportunities for active cognition processes, self-reflection, interaction and peer-teaching. At the same time, there is expert guidance from instructors whether online, face-to-face, or online Garrison, Anderson and Archer (2000).

In addition, a careful examination of this framework shows that none of the components stands alone. Also, the cognitive emerges from four different but overlapping components of practical inquiry: triggering events, exploration, integration and resolution. This means that designing a successful learning inquiry activity requires all four components. It therefore suffices to note that university halls are typical communities of inquiry as the cognitive presence of the learners, teaching presence, and social connections. To Akyol and garrison (2011), these three components are required to be balanced by the teaching presence. To corroborate the above, Archibald (2010) demonstrates that teaching presence and social presence explain 69% of the variance in cognitive presence. It therefore suffices to note that the role of the instructor is that of a leader. It however allows for and fosters peer-teaching among students.

Another key element of this model is that emotional presence was added, which is another important profile for the teaching position (lecturers) to handle in classroom or online presentations. In this light, Cleveland-Innes and Campbell, (2012); Stenbom, Cleveland-Innes and Hrastinski, (2016) argue that the interaction of human feelings and attitude in a community of inquiry with technology, presence determines, learners' success.

iii. Seven Blended learning structures in Education according to O'Connell (2016)

Some Blended Learning models include:

1. **Blended face-to-face class:** Also called the face-to-face driven model, it is based in the classroom. Here, online activities are used such as quizzes, readings; assignments are used to supplement face-to-face classroom activities. More in-person instructional time as the classroom is used for higher learning activities such as discussion and group projects.
2. **Blended online class:** most of the classes are conducted online, with few and short in-person activities such as lectures and labs.

3. **Flipped classroom:** this model is seen as a sub-model of the face-to-face or the blended online model. It is a reverse of the traditional class model of listening to lectures in class and doing assignments at home. In a flipped classroom, students watch a video sent by the instructor online, and then come to in-person classroom to complete group works, exchanges, projects or some exercises.
4. **The rotation model:** this model requires students to rotate between face-to-face classroom, labs, and online. The laboratory may sometimes be a computer multimedia centre where learners move from the lecture's hall on campus. Here we can talk of *stationary rotation (*students can rotate between stations in the classroom at an instructor's instruction), *individual rotation* (here, a student rotates in a personalized schedule).
5. **Self-blend model:** Here, learners chose to enrol in an online course to supplement their face-to-face classes. They are not directed by a faculty member since they choose the courses to take online and to take physically.
6. **Blended MOOCs:** this is a form of flipped classroom where by face-to-face class meetings are used to supplement a Massive Open Online Course. Here, learners access MOOC material from other institutions, or follow an instructor elsewhere online so far, the course is open access. They then come to a class meeting for discussions or in-class activities.
7. **Flexible–mode courses:** here, courses are offered in a hybrid model, both in-person and online, and allow learners the ability to choose that is suited for them.

Criticisms and Weaknesses of the Experiential Learning Theory

Since Kolb created the Experiential Learning Theory and the accompanying learning model, his work has been met with various criticisms about its worth and effectiveness. One of the criticisms of this model is that the concrete experience part of the learning cycle is not appropriately explained in the theory and remains largely unexplored. Another common criticism of the theory that "exposes a weakness is that the idea of immediate and concrete experience is problematic and unrealistic" (Miettinen, 2000).

Other criticisms of the ELT are that "the concepts outlined by Kolb are too ill-defined and open to various interpretations and that the ideas he presents are an eclectic blend of ideas from

various theorists that do not fit logically together. Another, perhaps more biting criticism of Kolb's work is that his ELT model is only an attempt to explain the societal benefit of his Learning Styles Inventory and thus may actually be a well derived marketing ploy. Also, it is believed that the phases in the ELT learning model remain separate and do not connect to each other in any manner" (Miettinen, 2000).

However, the most tangible weaknesses of the ELT and the ELT learning model are the vast differences between it and the ideas established by John Dewey, whose beliefs are largely attributed to the establishment of the ELT. Dewey believed that "non-reflective experience borne out of habit was the dominant form of experience and that reflective experience only occurred when there were contradictions of the habitual experience. But, in a glaring weakness of the ELT, Kolb does not adequately discuss the role of non-reflective experience in the process of learning" (Miettinen, 2000). In addition, Dewey believed that "observations of reality and nature were the starting point of knowledge acquisition". Kolb, however, believes that the "experience is the starting point of knowledge acquisition and disregards the observations concerning the subjective reality of the learner, another blatant weakness" (Miettinen, 2000).

A final weakness in the ELT that was noticed is "its lack of discussion concerning the social aspect of experience. The ELT learning model focused on the learning process for a single learner and failed to mention how the individual fit into a social group during this process and what role this group may play. Also, there was no discussion on how a social group may gain knowledge through a common experience". Experiential learning is accepted and even promoted in the field of education, as educators have "finally begun to recognize the complexity of the educational process" (Hendricks, 1994, p.1). However, "despite acknowledged benefits, experiential methods are still far from being universally accepted by educators themselves". There are several reasons for this, including classroom time constraints, difficulties with assessment, and lack of training in how to meet course outcomes experientially.

Experiential learning requires teachers to take time to encourage reflection. This is not only time-consuming, but requires the creation of a comfortable, relaxed classroom atmosphere and skilful questioning on the part of the facilitator. The results of taking the time required for periods of reflection is not something that can be measured quantitatively. Although "educators ... are giving up the idea that they can dissect, predict, and control learning with technological precision"

(Hendricks, 1994, p. I), and although there has been some movement toward more qualitative assessment in certain educational domains, many teachers are still expected to "teach to a test" (Hussin, Nooreiny, and D'Cruz, 2000, p. 1). When time is constrained, “administrative support limited, and course outcomes primarily focused in the behavioural domain, teachers find it difficult to try to incorporate experiential teaching method when if they believe in their value”.

Experiential leaning also requires “teachers to take on a different role in the classroom than the traditional teacher as-expert. In the classroom they become facilitators, guides, and helpers” (Spruck-Wrigley, 1998). Many ESL instructors are “already accustomed to this role. However, it often requires a paradigm shift for educators whose training and experiences have been to teach subject content using a teacher-centred approach” (Brooks-Harris and Stock-Ward, 1999). Suzanne Roy, “a pedagogical consultant for a large school board in Montreal, has done in-service work with teachers to implement experiential learning and portfolio assessment across the subject spectrum”. However, experiential learning is not uncontrolled; on the contrary, to be successful it requires the teacher to be prepared and organized before a project begins. “The teacher must think through each phase, planning with potential difficulties in mind, yet being creatively open to teachable moments" (Spruck-Wrigley, 1998). “A venue needs to be created for students to share their reflections and feelings about their experiences, both positive and negative, in a nonjudgmental and open environment. In true experiential learning, the teacher-as-facilitator role is central, and the project will succeed if the teacher can provide the necessary guidance through skilful, astute questions and a receptive, accepting heart and mind" (Oaneway, 1977).

Implications in this study

The experiential learning theory is well placed to be used by both teachers and learners to animate the learning environment as to tailor every action towards the development of digital economy skills. The secondary school cycle is the gate-way to today’s job market. A job market characterized by digital technologies and fast paced innovations, diversity, complexity, and constant change in the set of skills required. Any of the above models of blended learning can be used based on the resources we have at hand. However, the most lagging of these resources which are access to technological hard and software, and lack skills to use technology by teachers constitute the main blockages for the poor use of these models in the Cameroon secondary school

environment. This has continued to allow the presence of the traditional teaching/learning methods in our secondary schools.

2.4.2. The Technological Pedagogical Content Knowledge (TPACK) Framework on Learning Outcomes

Mishra and Koehler (2006) defined TPACK as "the basis for effective teaching by using technology". Besides, the meaning of TPACK includes; "concept teaching using technology, pedagogical techniques that use technology through constructivist approaches to teach course content, knowledge of what makes concepts difficult or easy to learn and how these problems can be overcome by technology, knowledge of input and epistemological theories and knowledge of how technologies can be used to build on existing knowledge and lastly to develop new epistemologies or strengthen old ones" (Mishra and Koehler, 2006). The ISTE (International Society for Technology in Education) (2007) standards, that 21st century students should have, include the "Digital Citizenship and Technology Practices and Concepts". Students who have "Digital Citizenship" competency give importance to the legitimacy and accuracy of the information they have reached on the internet. They have a positive attitude towards using technology that supports learning and cooperation.

Moreover, "students should be able to use technological applications, understand pertinent concepts and use new technology to learn via transferring their prior knowledge. One of the ways these standards can be referred to during instruction is producing a lesson plan developed with the TPACK framework. Bearing in mind the pedagogy; the methods that will be resorted to while presenting the input, the content itself and the technology that will be used is crucial in that sense. In fact, the harmony of all these three important components is essential as the more there is harmony the more effective and memorable the process becomes. Therefore, TPACK framework enables teachers to make effective lesson plans and at the same time enables students to be successful and productive individuals" (Lingenfelter, 2015).

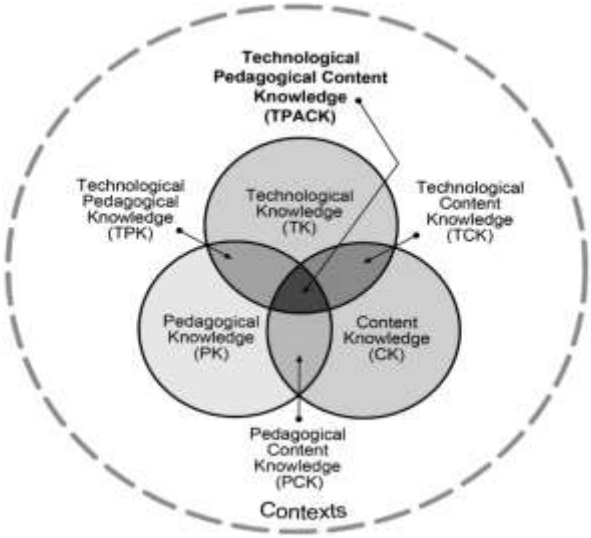
According to Yadin (2011), "the programming course is thought to be the hardest course by the students". Thus, "to be able to eliminate this prejudice of learners it is decided to support a programming class with TPACK framework in middle (secondary) school. Since problem-solving and computational thinking skills are believed to be the efficient factors in learning/teaching of

programming" (Bers, Flannery, Kazakoff and Sullivan, 2014; Chao, 2016; Chen, Shen, Barth-Cohen, Jiang, Huang, and Eltoukhy, 2017; Kalelioglu, and Gülbahar, 2014,) "they are selected as the determinative skills in this study. The aim of this study to that end is to determine the effects of programming education with the TPACK framework on the learning outcomes of secondary school students".

In the diagram below, Mishra and Koehler (2006) advocate the use of pairs at the intersect point:

- Pedagogical content knowledge (PCK);
- Technological content knowledge (TCK);
- Technological pedagogical knowledge (TPK).

Graph 13: TPACK Framework (Mishra and Koehler, 2006)



Using TPACK as a framework to "deliver computing/programming/informational technology courses can be suggested considering the potential benefits for students in terms of academic achievement, problem-solving and computational thinking skills. Taking into account appropriate educational settings for the 21st century, using and improving TPACK framework for primary and secondary school students is fundamental" Mishra and Koehler (2006).

As far as the integration of ICT within the educational process is concerned, a deep understanding (by the teachers) of the relations between the three components (technology, pedagogy and content) of the TPACK framework is required. The context's definition could

contribute positively to this direction and to the effective implementation of the TPACK framework (Philips 2015) within the suggested Teacher Professional Development (TPD) programme. The following table (Lasica et al. 2018) describe the necessary knowledge axes of the TPD programme (Jimoyiannis 2010) to the related knowledge that lies at the TPACK framework intersection (PCK, TCK, TPK).

To ensure the successful integration of TPACK, the suggested TPD programme involves teachers in both the design of the educational activities (through the lesson plans) and the creation of augmented reality Learning Objects (LOs) (supporting the lesson plans designed) that they will then apply in their classrooms and/or school laboratories.

Table 17: Matching of TPACK knowledge insertion with knowledge axe within secondary education in the suggested TPD programme (Lasica et al. 2018)

TPACK Knowledge	Knowledge axes within secondary education
PCK	Awareness of curricula concerning STEM-related courses (Mathematics, Physics, Chemistry, Computer science, etc.
	Scientific Knowledge of STEM-related topics/concepts
	Awareness of difficulties and misconceptions in STEM-related topics
	Pedagogical models- teaching approaches concerning STEM courses-willingness for collaboration between teachers of different courses-promotion student-centred approaches
TPK	Pedagogical models-teaching approaches based on ICT, especially Augmented Reality (AR) technology
	Promotion of Inquiry-Based Learning and interdisciplinary within STEM courses, supported by AR
	Self-esteem and real experience acquirement concerning the usage of AR during the educational process
TCK	Familiarisation with AR tools, applications and existing libraries
	Knowledge and skills on the effective integration of AR within the educational process in the context of STEM-related courses
	Technical issues prediction and/or resolution

Limitations of the TPACK Framework

One key weakness of the TPACK framework is perhaps the unrealistic expectations it places on practitioners. It is implied within its model that teachers as trained reflective practitioners, will be able to self-diagnose their weaknesses and strengths in each knowledge domain of the TPACK model (Kinchin 2012, 2013). Not only that but after successful self-diagnosis, teachers are expected to self-correct some of the imbalances they detect in their technology-enhanced learning application, based on, for teachers, often impenetrable descriptions of the needs for balance and alignment between TK, PK and CK and their intersections resulting in PCK, TCK and TPK before arriving at a perfectly balanced TPACK.

Unsurprisingly, a number of researchers have grappled with how to close the knowledge gap between theory and practise of effective integration of the TPACK model. Thus, many teachers do not yet well understand the dynamic relationship between the three (3) components (TK, PK and CK).

Implications in the Study

In this study, pedagogical content knowledge is related to the teaching approach and also programme/curriculum content. “Technological Content Knowledge is about what technology should be used to teach successfully and Technological Pedagogical Knowledge is relative to choosing the most appropriate IT tool according to the determined learning / teaching needs” (Hu and Fyfe, 2010). This framework can be used with a view to developing students’ skills like: problem-solving, creativity, algorithmic thinking, collaboration and critical thinking. Also, the Education and Training Sector can use the “TPACK framework not only for teacher education but also for primary and secondary education and it can be used for the benefit of both students (primary/secondary/high school) and teachers. There are studies found in the literature investigating the effects of course plans on teachers and students which are formed by TPACK framework”.

2.4.3 "Unified Model of the Human Capital Theory for the 21st Century Industry According to Peña (2020)

Much of the literature on Human Capital Theory (HCT) published in the 60s mostly focused on the value of education and training and its importance in enabling and predicting success in the work environment, and in maximizing and maintaining high lifetime earnings. It suffices to bring to our notice that how people accumulate human capital stocks through new learning patterns, and the skillset context of the labour market have changed given the fourth industrial revolution, characterized by digital technologies and unprecedented innovations. It is also very important to note that the language used by its proponents to describe human capital changed significantly as a result of a rise in automation, machine learning, artificial intelligence, remote working, and an uncertain labour market in general. Therefore, generalizing human capital dynamics in the 21st century classroom and workplace will be an irreparable error to make.

The theoretical bases of the HCT that emerged with the seminar works of Mincer (1958), Schultz (1961), Becker (1962) and Ben-Parath (1967) remain the cornerstones of this theory. Despite the hard winds that have transpired between the former and today's 21st century, these works led to the formal inquiry into human capital stocks that are specific to every job market revolution. Their invaluable contributions have withstood the test of time with the following universal conclusions on the HCT:

- Schooling and various forms of training increase the human capital stocks that prepare learners for the incumbent workforce;
- Decisions on education, training and upskilling are based on the economic agenda of maximizing and maintaining lifetime earnings;
- Human capital investment or its production increases the potentials for high wages, increase labour productivity, and therefore produce marginally more work opportunities;
- Skills gain in a lifetime face the risk of worn-out thus requires permanent upskilling so as to adjust to new job market exigencies.

Observing from above, we can note that the HCT values learning in various forms that particularly align with the rational choice of the individual to maintain an economic position that enables her to maximize gains for both the present and the future. This is to say that learning plays

a crucial role in the development of the human capital stocks (digital economy skills) required by the job market. How today's learning should therefore be shaped to respond to the 21st century workplace forms one of the bases of revisiting the HCT. Also, the transformative change ushered by rapid technological advancement, greater interconnectedness, the offshoot of new skillsets, and the threats to substitute labour with technological automation or Artificial Intelligence makes it necessary for this theory to be revisited, refreshed and realigned to the current state of affairs, and to our unforeseen work environment.

It is based on the above worry on how to align the HCT to the 21st century work environment that Pena (2020) laid down a "Unified model of the Human Capital Theory for the 21st century industry" which had as a central construct that vital elements in learning theories of individuals as they engage in the work environment must be updated to move closer to the current reality. According to this author, the Ben-porath model, Beckers' model, Killingworth's (1989) learning by doing view can be integrated to form a unified model where connectivism is a cross-cutting component.

According to Pena (2019), "all models are consistent in the treatment of human capital and work as inputs to the production of earnings. An individual uses both her human capital stock and work at any given time $\boldsymbol{t}$ to produce an earning $\boldsymbol{W}$. At any given time, she uses a combination of both human capital and work activities or functions that, from her viewpoint, maximize the present value of her lifetime earnings. Nuances across models are subtle: The Ben-Porath Model treats human capital as a form of production in conjunction with the production of work, Becker's View treats human capital as an investment, and LBD (Learning by Doing examines human capital within the lens of experience as a form of learning that could no longer be ignored". While all models treat human capital as a way for individuals to maximize the present value of lifetime earnings, its treatment varies across. He concludes that technology and connectivism must be at the centre of education and training while in the process of developing human capital stocks.

Implications in this study

The Pena's unified model is well suited for this study as it provides the dynamics and for education and training institutions to understand that the whole process of developing human capital stocks should be directly tied to the current workplace exigencies. This aspect is well

defined in Becker's view which is particularly concerned with the type of investment in humans that will lead to increased work production, and matched by high earnings. This signifies that secondary school curricula must carry human capital stocks that respond to Becker's view. Moreover, today's job markets require specific skillset from employees to be productive as expected. This falls in line with Ben-porath's model that focuses on production and work, meaning that human capital stocks by secondary schools must align to this clause. It also suffices to mention the fact that Pena (2019) was quite conscious of the nature of today's work environment. Reason for unifying the learning by doing model together with the views of Becker and Ben-Porath, and using technology and connectivity will certainly update the HCT to the development of skills for the digital economy among learners.

2.4.4. The Signalling Theory

This theory holds that education also has a signalling function. Propounded by Spence in 1973, this author explained how workers could sell their skill or abilities to the labour market by reducing information asymmetry. In other words, education also "signals" or screens intrinsic productivity (Spence, 1973, Arrow, 1973, stiglitz, 1975). This theory is fundamentally concerned with reducing information asymmetry between two parties; that is between job applicants and employers or between products of educational institutions and the labour world. This theory has the following assumptions:

- There exists information asymmetry between employees and employers.
- Education has a signalling function for the availability of skilled workers.
- Higher levels of education are associated with higher earnings not because they raise productivity, but because they certify that the worker is a good bet for smart work.

i. Information asymmetry and the signalling process

Information asymmetry refers to the uncertainties and blackouts in information flow among stakeholders in a particular domain. This concept has mostly been used by economists who rely mostly on perfect information before making market decisions. In this respect, Stiglitz (2002), explains that "information asymmetry exists when 'different people know different things. Because some information is private, information asymmetry arises between those who hold information and those who could potentially make better decisions if they had it".

Evidently, information is very crucial in regulating market conditions of all forms including the labour market. In this respect, George Akerlof, Michael Spence, and Joseph stiglizt received the Nobel Economic prize in 2001 based on their commendable work on information asymmetry in modern economics markets. In 2000, Stiglizt highlighted two types of information where asymmetry is important: they are information on quality, and information about intent or behaviours of workers. The first examines the characteristics of the other party in terms of work productivity, whereas the other is concerned with the behavioural insertions of the employee. However, what is most important here is the question: how does signalling resolves information asymmetry? In other words, we focus on the role of signalling in understanding how parties resolve information asymmetry on latent and unobservable quality.

In his formulation of the signalling theory, Spence (1973), used the labour market to describe the signalling function of education. He principally held that potential employers lack information about available quality of job candidates. However, these candidates are to obtain education to signal their quality of skills to the job market in order to mitigate the effect of information asymmetry. Moreover, education signal is considered a reliable one for the simple reason that those with low quality skills and as a result of low education would not be able to send any signal to the job market because they cannot stand the rigor of secondary education.

Also, the variable of quality is important as information on skills of job candidates is being communicated by education. In this light, the aspect, signalling is always associated with screening, in the sense that industries are to screen the quality of skills signalled to them by job seekers before deciding on whether to recruit or not (Akerlof, 2005).

Brian Cornelly et al., (2011) identifies three key elements in the signalling process: the signaller, the signal and the receiver. Added to these elements are feedback and the signalling environment.

The signaller: the signaller is considered as an individual, an organization, an industry or a firm that has underlying qualities. In the signalling timeline, the authors consider signaller as managers and directors of companies who receive information from individuals that is not available to outsiders. This information can be positive or negative, coming from mostly company

agents which helps the company to adjust it production behaviours. Such information could be on specifics about the firms' products or services.

Signals: A signal constitutes observable and unobservable characteristics, for example; of skills in a labour market situation or of products and services in corresponding market circumstances conveyed to organizations or otherwise. In Cornelly's model, signals come either in positive or negative information. However, it is the decision of the insiders to send out what type of information as signals to attract customers or improve the image of the company. To Spence (1973), signals should normally be positive information on skills, products or services.

An important issue to mention in the signalling theory is the *observability* of personal characteristics, which is the extent to which the public or targeted stakeholders are able to notice the signals, say the quality of individual and productive capabilities (Akerlof, 2005).

The Receiver: these are outsiders or job market stakeholders, for example who lack signals, but would like to have them. In essence, receivers rely on information before hiring, purchasing or investing in a deal. Again, signallers and receivers often have conflicting interest such that each party poses strategies to benefit more at the expense of the other (Bird and smith, 2005 in Cornelly et al., 2011).

Feedback: this refers to the response to a signal, sent by the receiver to the signaller. In the labour market for example, feedback occurs when an industry or organization makes a decision to hire a signalled skill. This decision is often considered partial when the response is still at the interview stage (recruitment test). Here, we say feedback was simply based on observable characteristics of individuals.

Nonetheless feedback is largely based on ***employers screening.*** In this direction, Jones, Wilness, and Madey (2014), explains that for the signal to obtain a feedback, screening must take place. This author further explains that job applicants made the first move choosing their level of education to signal their intrinsic attributes. Employers then interpreted this signal in order to make their wage offer, also on their prior beliefs. Equilibrium occurs when the employer's belief about this signal turns to be true. That is, the signal meets the employers' needs and corresponds to his wage offer. He then sends feedback to convoke the job applicant for recruitment. However, this game can also occur otherwise, when firms or employers are the one to make the first step by

sending a signal for job applicants who match such signals to screen and then send signals to the firms (Stiglizt, 2001).

Signalling environment: the environment either between organizations or between individuals can also affect the way signalling reduces asymmetry information (Rynes et al., 1991). Frankly speaking, when the medium propagating the signal reduces the observability of the signal, we conclude that environmental distortion has occurred. For example, the media may report the signals for job candidates by specifying the school from which the individual graduated. However, in most cases, the status of such schools may project low quality in terms of education and training.

ii. Implication of the Signalling Theory in the Study

The signalling theory squarely explains the dynamics between secondary schools and the digital work environment. The graduate certificate or education credentials serves as a signal to job market stake holders, or employers, who in turn carry out some screening based on the observable and intrinsic qualities of the signals, and on employer's prior beliefs. Feedback is then sent to these graduates who are job applicants at the time for recruitment.

In fact, Spence's model, which was later detailed by Cornelly et al., (2011) using the signalling timeline, fits in this study as follows:

- **The *signaller*** (secondary school graduates /business world). On a first note, in the case where the signaller is a secondary school graduate, they send signals by depositing job applications in these firms;
- **The *signal*** is their level of education which is the secondary school graduate certificate, which qualifies the graduates to acquire jobs. The signal carries the intrinsic characteristics of the signals which refer to the nature of skills, then the quality of the skills. Here, aspects of skill relevance and performance in terms of score of grades will also be considered. Here, digital economy skills are the signals most employers of today's job market expect to see on the credentials;
- The ***Receiver*** constitutes Human Resource Managers of these firms, Board of directors and screening team for the signals or world of work at large. Also, employees become receivers when firms advertise job positions;

- **The signalling environment** now refers to the medium through which signals are being conveyed to these firms. It can be through personal contact by these graduates to deposit their application files, or through press releases at times by the secondary schools through the announcement of graduates with skills in various fields;
- ***Feedback*** information is often sent to potentially selected candidates for recruitment, after a deep screening of signals have occurred in the firms.

The signalling model described is a two-way flow, that is where the signaller is an individual or a graduate, and the receiver constitutes firms or enterprises. Conversely, the game can also happen where signaller constitutes firms, industries enterprises…, whereas graduates become receivers (Stiglzt, 1976) in this case, the graduate who is a potential job searcher now is the one to do the screening of the signals sent out by firms, and to select that which corresponds to his/educational level, and possibly wage offer.

Quite often, this other-way- round of the game is not beneficial only to job searchers, but largely to education and training institutions (Spence, ibid). In this light, Rothschild and Stiglizt (1976), in what they called the screening game asserts that, education and training institutions become overwhelmed and adjust their training programmes and approaches since signals sent out by employers or firms describe in detail the intrinsic quality of industrial needs. However, training institutions integrate the wave of job market needs in the training of future workers. This is an important avenue opened by this theory for this study, which advocates for readjusting secondary school education and training to today's digital labour market.

Limitations of the Signalling Theory

In spite of evident research and data demonstrating the importance of signalling theory helping graduates to pick up quality jobs, and also helping to adjust and improve the relevance of secondary school learning to graduate employability in the 21st century work environment, this theory also harbours some limits which are as follows:

If education only acts as a signal and not an independent contributor to an individual's productivity – enhancing human capital, it follows that:

- Education is a very expensive and time-consuming signal;

- Education may not be an effective signal. It may not be able to screen the most productive individuals, especially when there is a voluntary stop or when one has a low expectation of the returns to education. In this case, it would be beneficial to find a less costly signal.

As far as productivity and on-the-job-returns are concerned, some proponents of the signalling theory "point to the lower returns to education, of self-employed work relative to private sector work as evidence of the effects of signalling. The argument is that returns to self-employment can only represent returns to human capital; after all, there are no information asymmetries when a person employs himself and, as a result, there is no need for signals".

Brown and Sessions (1999) found "higher levels of education and higher returns for individuals employed privately as compared to self-employed individuals, which supports the signalling hypothesis. Opponents of signalling offer a counter-argument and point to a selection bias", which Brown and Sessions (1999) do not account for. The assumption made by Brown and Sessions (1999) in their study is that "individuals know that they will be self-employed when they make their educational decisions" (Chevalier 2004). If this assumption fails, then "individuals might possibly be educating in expectation of the need to signal in the future, because they do not know at the time that they will be self-employed". This might explain (independent of signalling theory) the lower returns to education for the self-employed observed by Brown and Sessions (1999).

To conclude this chapter, it is important to note that digitalising secondary education in Cameroon is fundamental to achieving its goal to transform Cameroon into an emergent nation by 2035. Therefore, the Ministry of Secondary Education has an overwhelming responsibility to streamline issues related to effective integration and to update the presence of ICT. Also, worthy of note is the fact that the implications of a highly digitalized secondary school in Cameroon are multivariate. While the Ministry sets in the pace as the main overseer, state and secondary/high schools grapple with the implementation of the policy in terms of governance, programmes, infrastructures, and teaching strategies, with the ultimate goal to enhance the development of skills for the digital economy. The study, reviewed the conceptual literature and the related literature. This has been done based on the five variables of the study. The theories of the study have been inserted to enhance a deep understanding of the study in all its aspects.

CHAPTER THREE: METHODOLOGICAL FRAMEWORK ON THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY

This section of the work examines the type of study, the study design, the population, the sample, sampling technique, the area of study, research instruments, and the construction and validation of research instruments. In effect, a detailed description of the methodology undertaken to arrive at the results of this study will be presented in this chapter. Similarly, the reasons underlying the chosen methodology are explained and the various instruments and justifications for their usage are presented. It suffices to mention that the methodology used in this study falls within the limits of social science research methods as presented below:

3.1. Area or Site of Study

3.1.1. State Universities

This study touches on the formally existing eight state universities, but has been carried out in four of these university sites in Cameroon, they include:

- The University of Maroua;
- The University of Yaoundé I;
- The University of Buea;
- The University of Douala.

i. The University of Maroua

The University of Maroua (UMa) is located in the city of Maroua, the divisional head quarter of the Far North Region of Cameroon. It was created by Presidential Decree No. 2008/280 of August 9, 2008, https://www.prc.cm. The administrative and academic organization of this institution went operational under Decree No. 2008/281 of August 9, 2008, https://www.prc.cm. which saw the creation of the Higher Teachers' Training College, and the Higher Institute of the Sahel (transformed to National Advanced school of Engineering by presidential Decree No. 2017/350 of 6 July 2017) https://www.prc.cm. The institution now has 07 institutions since the academic year 2014/2015. These are: The Faculty of Arts and Human sciences, the Faculty of Sciences, The Faculty of Economics and Management, The Faculty of law and Political Sciences, Higher Teachers Training College, the Faculty of Mines and Petroleum Industries,

formally the Higher Institute of the Sahel, and transformed by Decree No. 2022/011 of 11 January 2022, https://www.prc.cm.

The reason for choosing this university is based on the fact that it is a higher institution and a state university, which constitutes the target study area of this research. This institution is equally charged with the mission of developing the 21st century work skills on learners with the use of technology, reason why there is a multimedia and resource centre herein. Also, a digital centre resulting for the E-National Higher Education Network project is under construction in this university. Also, the population of this study which constitutes those of social and human sciences classical faculty learners, administrators, and teachers found in this university.

ii. The University of Yaoundé I

The university of Yaoundé I (UYI) was created in 1993 following the university reform that split the oldest federal university into two (the University of Yaoundé I and II. This was done through decree No. 93/036 of 29 January 1993. It is a bilingual scientific and cultural university, that is located in Ngoa-Ekelle, Yaoundé, the Centrre Region of Cameroon, https://www.uy1.uninet.cm.

The University of Yaoundé I is a non-profit public higher education institution with a population range of between 1,000,000 and 5,000,000 inhabitants. Officially recognized by the Ministry of Higher Education of Cameroon, UYI is a large-sized (uniRank enrollment range: 10,000 to 14,999 students) coeducational Cameroonian higher education institution. It offers courses and programmes leading to officially recognized higher education degrees such as bachelor's degrees in several areas of study. UYI also provides several academic and non-academic facilities and services to students including a library, sports facilities, study abroad and exchange programmes, as well as administrative services.

The University of Yaoundé I consists of six (06) institutions:

- The Faculty of Arts, Humanities and Social Sciences;
- The Faculty of Sciences;
- The Faculty of Medicine and Biomedical Sciences;
- The Higher Teachers' Training College;
- The National Advanced School of Engineering;

- The faculty of Education.

The choice of this university also falls with the character of this study in terms of the population under study, its status as one of the oldest state universities, and for the fact that it has served as an experimental institution for digital learning, and research for many years, in this light, Teke (2012) recounted that UYI has been frequently involved in online course management and digital learning in general. This university has been noted for a considerable evolution in e-governance, mostly in terms of managing students' online enrolment, and staff management through online information management systems. This has been achieved through the university website https://www.uy1.uninet.cm.

iii. The University of Buea

The University of Buea is in Molyko, Buea, precisely in the Southwest Region of Cameroon. First founded as a university centre in the year 1985 and later became a full university in the year 1992, following Presidential Decree No. 92/074 of April 13, 1992, reorganizing the country's state universities. Decree No. 93/034 also of January 19, 1993 giving the basis of the organization of the University of Buea. The above reforms were introduced to improve performances at the level of higher education and to achieve a number of well-defined objectives. It is an Anglo-Saxon university that receives Cameroonian and foreign students of both expressions [English and French]. It upholds as mission: Teaching, Research and outreach. This University intervenes in professionalism, arts, science and technology. The University of Buea is made up of 10 institutions subdivided into faculties, schools or colleges as follows:

- Faculty of Arts Sciences;
- Agriculture and Veterinary Medicine Faculty;
- Faculty of Education;
- Faculty of Engineering and Technology;
- Faculty of Health Sciences;
- Faculty of Sciences;
- Faculty of Social Sciences and Management;
- The Advanced School of Translators and Interpreters;
- The College of Technology;

- The Kumba Higher Technical Teacher Training College.

https://www.ubuea.cm

The choice of the UB is motivated by the fact that it is a state university, and constitutes the population sample characteristics on this study. The University of Buea, away from just being designed for the continuous quest for excellence, through the promotion of moral and human values and being at the service of the community, equally engages in technology-based learning and distance learning in particular, given the sociological crisis that often keeps lecturers and students at home due to ghost towns, and eventual cross fire along the way to the campus. This has resulted to a significant shift in learning online.

iv. The University of Douala

The University of Douala, unlike other state universities in Cameroon was created and organized by Presidential Decree No. 93/030 of 19 January 1993. It is a transformation of the then University Centre of Douala then composed of the Higher institute of Economic and Commerce (ESSEC-1977) and the Higher Technical Teachers' Training College (ENSET-1979), founded on 28 April 1977 into a university on 13 April 1992, Following Decree No. 92/74 on the transformation of university centres into universities. The basic missions of the University of Douala are: knowledge, research, development. It intervenes in the education and training of learners in the domains of economics and commerce, technical training, industrial engineering, medicine and pharmaceutics, arts, fisheries science, humanities, law and politics, sciences, economic sciences and management. The University of Douala is made of ten (10) institutions as follows:

- Faculty of Industrial Technology;
- University Institute of Technology;
- Faculty of Sciences;
- Faculty of Medicine and Pharmaceutical Sciences;
- Institute of Fine Arts;
- Institute of Fisheries;
- Higher School of Economics and Commerce;
- Faculty of Letters and Human Sciences;
- Faculty of Law and political sciences;

- Faculty of Economics and Applied Management.

Unlike the other four state universities, the University of Douala has the population and problem characteristics of this study since developing the skills for work on learners is prime mission.

3.1.2. The Distance Learning Centre

Since June 12, 2020, the Ministry of Secondary Education of Cameroon has made available to students in exam classes a distance learning website at the following address: https://minesec-distancelearning.cm/.

To make the best use of this E-learning site before the end of year exams, here is what to do:

- Open the site at the following address: https://minesec-distancelearning.cm/;
- Choose the language by selecting one of the following sub-systems: ENGLISH SUB-SYSTEM or FRENCH SUB-SYSTEM;
- Choose one of the 3 types of teaching from among the following: GENERAL, TECHNICAL or NORMAL;
- Choose one of the classes in the menu on the left: from 6th grade to 12th grade;
- Click on the course you are interested in to play the video.

3.1.3. The Ministry of Secondary Education

Three main departments are in charge of teaching-learning transactions in the Ministry of Secondary Education.

i. The Department of General Secondary Education (DGSE)

It is in charge of General Secondary Education such as Government Secondary Schools (GSS) Government High Schools (GHS) in both government and private sectors and in both francophone and anglophone subsystems. General Secondary Education has two main series: Arts and Sciences.

The duration of studies is five (5) years for the 1st Cycle and two (2) years for the 2nd Cycle. After five years of studies, students sit in for the General Certificate of Education Ordinary Level (GCE OL) examination. In the seventh year, students sit in for the General Certificate of Education Advanced Level (GCE AL) examination in any chosen series.

Table 18: Certificates in Anglophone secondary general education

Level	Duration	Certificate
1st Cycle	5 years	General Certificate of Education Examination Ordinary Level
2nd Cycle	2 years	General Certificate of Education Examination Advanced Level

Students who have completed secondary school education can continue their university studies in Higher Institutions.

ii. The Department for Secondary Technical and Vocational Education

It is in charge of Technical Secondary schools, namely, Technical High Schools (GTHS) and Technical Colleges (GTC). A distinction is made between the Government Technical College (GTC) and Girls Technical Colleges (GGTC). The two types of fields are: Tertiary Sciences and Technology (STT) and Industrial Sciences and Technology (IND).

The duration of studies is 4 years for the First Cycle and 3 years for the Second Cycle. At the end of the First Cycle, CAP (Certifiact d'Aptitude Professionnel) is awarded meanwhile by the end of the Second year of the Second Cycle, students obtain a Technical Probatoire Certificate which corresponds to the field of study chosen in the class of seconde. Then in the final year of studies students obtain a Baccalauréat or the Technical Certificate corresponding to the field.

Table 19: Certificates in secondary technical education

Level	Duration	Certificate
1st CYCLE	4 years	Technical and Vocational Education Examination Intermediate Level
2nd CYCLE	3 years	Technical and Vocational Education Examination Intermediate Level

iii. Department of Teacher Training

Training Colleges are vocational training institutions responsible for the basic training, advanced training or refresher training and the specialisation of teachers of General or Technical Education.

There are two types: Government Teachers Training College (GTTC) and Government Technical Teachers Training College (GTTTC).

The duration of training varies from one to three years. Holders of Technical and Vocational Education Examination Advanced Level (TVEEAL) spend one year, and holders of Technical and Vocational Education Examination Intermediate Level (TVEEIL) spend three years.

At the end of this training, as their choice may be, the student teachers sit in for a certificate examination called Teachers Grade 1 Certificate known by its French acronym as CAPIEMP or a Technical Teachers' Grade 1 Certificate known as CAPIET in French. Holders of CAPIEMP are those endowed with professional skills to teach nursery or primary school pupils, while holders of CAPIET teach in Technical Education Colleges, SAR/SM and Rapid Vocational Training Centres.

Table 20: Certificates in teacher education

Training schools	Level	Duration of training	Vocational certificate obtained
GTTC	GCE O Level	3 years	Teachers Grade 1 Certificate (CAPIEMP)
	TVEEAL	1 year	
GTTTC	TVEEIL	3 years	Technical Teachers' Grade 1 Certificate (CAPIET)
	TVEEAL	1 year	

3.2. Research Design

According to Creswell (2008), a research design is a plan and the procedure for research that spans the decision from broad assumptions to detailed methods of data collection and analysis. This study used both quantitative and qualitative research approaches. Also known as the mixed method of inquiry, this can be used when the research variables constitute both quantitative

and qualitative elements. To Creswell (2003), it implies the procedure for collecting, analysing, and interpreting both quantitative and qualitative data in a single study. Campbell and Fiska, 1959 in Amin, (2005) explains that this mixed design allows for researchers to use at same time for example, observations and interviews, which are qualitative instruments, then combine with surveys which are quantitative instruments. The research design used in any study has a link with the nature of the variables. However, variables that can be quantified often take the quantitative approach while those of quality often take on qualitative approach.

3.2.1. The Exploratory Case Study Research Design

It can be defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used" (Yin, 1994). Case studies enable a researcher to make an intensive investigation on the complex factors that contribute to a happening or an event. Amin (2005) explains that case study emphasizes detailed contextual analysis of a limited number of events or conditions and their relationships. However, case study probe deeply and in an intense way, analyses interactions between the factors that produce change or growth. In the same light, Yin (1984) notes that there exist three types of case studies: exploratory case study, descriptive case study, and explanatory case study. This study has adopted the exploratory case study design of which according to Yin (1984) is a study design that sets out to explore any phenomenon which serves as point of interest to the researcher or to the study.

In this study, the exploratory case study design explores the nature of the education system and the development of the digital economic skills on secondary school graduates attending their first-year courses at the university. It is in this direction that the study explores the educational system in terms of educational policy design, curriculum, governance, equipment, teaching approaches, teachers training or skills on the development of the digital economic skills.

3.2.2. The Survey Design

This is a quantitative design that allows for the collection of information from a large population. Check and Schutt (2012, p.160) define survey research as the collection of information from a sample of individuals through their responses to questions. To this author, the primary

purpose of this type of research design is obtaining information describing the characteristics of a large sample of interest with less difficulties and relatively quickly. It is commonly used in studies which constitutes large population sample. In this study, the survey design was used to collect information from secondary school graduates undertaking their first-degree courses in the University.

3.2.3. Reasons for Using the Mixed (Qualitative and Quantitative) Design in this Study

The mixed method of inquiry was used in this study for the main reason of the complex nature of the various categories of the population involved. As a result, the same instrument type could not be used to collect data from these various categories of the population.

In effect, the population was made up of secondary school graduates and some officials from the Ministry of Secondary Education. This category of the population permitted us to obtain detailed explanations or enabled us to have a good insight of the problem. These persons went further to make suggestions of how such problems could be tackled which was of interest to this study. Thus, interviews guides (which are qualitative instruments and hence a qualitative approach) were used to obtain information from secondary school teachers, administrators or principals and from some officials of the Ministry of Secondary Education. On the other hand, graduates who were large in number had to respond to questionnaires (which are quantitative instruments, and hence quantitative approach). Here, items were constructed with the Likert scale, based on the variables in this study.

On another note, the sampling techniques used in this study allowed us to use the mixed method of inquiry. In fact, officials at the Ministry of Secondary Education, administrators or principals, secondary school teachers, were selected through judgemental or purposive sampling. The judgemental sampling method is as non-probabilistic or qualitative methods of selecting the sample of a study.

On the other hand, graduates from the secondary school, who enrolled in their first-degree courses at the university, were selected using the stratified-random sampling method which is a quantitative method of selecting the data of a study. Therefore, when both quantitative methods of selecting information are mixed with qualitative, we talk of the mixed design.

Another justification for using the mixed approach lies in the techniques of data analysis. In this study, both quantitative analysis (inferential statistics), and qualitative analysis content analysis have been used.

Also, the mixed approach was used in this study because the concept of the development of skills for the digital economy cannot fully be solely captured with quantitative study. It requires both qualitative and quantitative so as to get the insights of the problem.

3.3. Population of Study

In this study, the population is made up of secondary school graduates at their first or second year in the university, secondary school teachers, school administrators or principals as well as officials from the Ministry of Secondary Education. We have also before now, made known the different state Universities in which we shall carry out this study:

- The University of Maroua;
- The University of Yaoundé I;
- The University of Buea;
- The University of Douala.

3.3.1. The targeted population

This is the population on which the researcher ultimately wants to generalize the results of his study. This population sometimes may not be accessible to the researcher. In this study, the targeted population constitutes graduates from secondary school who enrolled in their first or second year course in some classical faculties of some state universities in Cameroon, secondary school teachers, secondary school administrators or principals and officials from the Ministry of Secondary Education. It is on this population that the results of this study shall be generalized.

3.3.2. The Accessible Population

This is the population from which the sample of the study shall be drawn (Amin, 2005). This is the population which is reachable or that the researcher can easily penetrate in order to draw the sample of the study. In the case of this study, the accessible population constitutes

graduates from the secondary school who are enrolled in their first or second year course in the university in classical faculties. They were selected from four of the state universities:

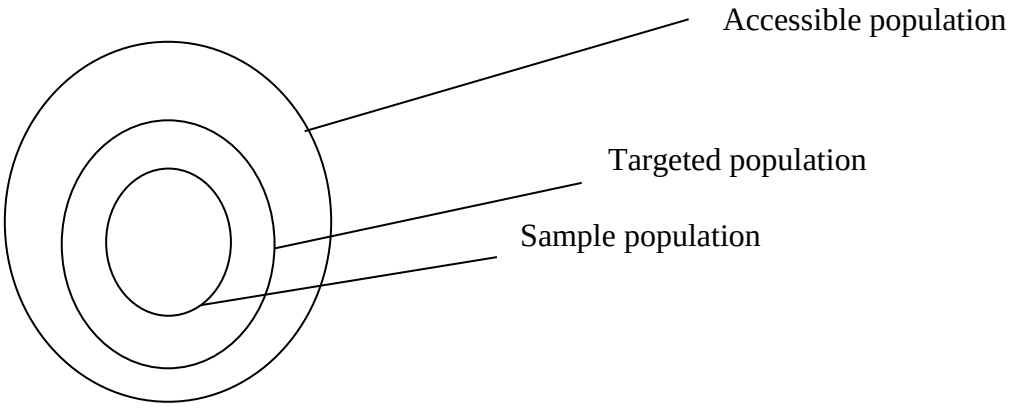
- The university of Maroua;
- The university of Yaoundé I;
- The university of Buea;
- University of Douala.

They were selected from the Departments of English language and Literature, History, French language and literature, bilingual letters, Anthropology, psychology, Philosophy, Law and Political sciences, Geography, Economics, and Education. Moreover, secondary school teachers, secondary school administrators or principals and some officials of the Ministry of Secondary Education were equally accessed by the researcher.

3.3.3. The Sample Population and Size

The sample population in this study constitutes some secondary school graduates who are enrolled or studying at their first or second year in some Departments of some state Universities such as, the departments of English language and Literature, History, French language and literature, bilingual letters, Anthropology, Psychology, Philosophy, Law and Political Sciences, Geography, Economics, and Education in the University of Douala, the University of Yaoundé I, the University of Buea, and the University of Maroua. Some officials from the Ministry of Secondary Education, some secondary school administrators or principals and some secondary school teachers, formed part of the population sampled. The relationship between the sample population, parent population, the targeted population, and the accessible population is shown in the diagram below:

Graph 14: The difference between targeted, accessible and sample populations (*Source:* Teneng, 2016; adopted from Amin, 2005. *Professionalization in higher education and employability of graduates in Cameroon.* An unpublished thesis defended in the University of Maroua, 2018.)



3.3.4. The Sample Size

Altogether, 865 secondary school graduates were selected from the four state universities, 265 from the University of Yaoundé I and 200 from each of the others. 04 officials from the central services and 04 Regional Pedagogic Inspectors of the Ministry of Secondary Education were interviewed, a participant observation was also carried out at the Digital Education Centre.

3.4. Sampling Technique

Two major sampling techniques were used in this study for corresponding reasons. These are the purposive or judgemental sampling technique and Stratified-Random sampling. They are explained in details below.

3.4.1. The Purposive or Judgemental Sampling

This is a qualitative sampling methodology that allows for the researcher to choose participants based on purpose or individual judgement that they can produce relevant information for the study. This sampling technique was used to select some officials of the Ministry of Secondary Education, some secondary school administrators or principals, and some secondary

school teachers involved in the usage of technology in course design and teaching. This category of respondents was sampled for interview.

3.4.2. The Stratified-Random Sampling

This sampling technique allowed participants to be grouped in stratum, based on homogeneous characteristics. Therefore, the random approach was used to gave equal chances to all members of the population to be selected. In this light, some secondary school graduates who are enrolled or study at their first year in some state Universities were grouped according to their disciplines (considered as stratum), of which the researcher proceeded with a random exercise to pick respondents for them to answer to questionnaires. The various disciplines involved in this were: geography, history, sociology, anthropology, English language, French language, bilingual students, and foreign languages. This signifies the researcher selected respondents by the lottery technique in 9 strata.

3.5. Instrumentation

According to the American Psychology Association (APA, 2020), instrumentation is the concept that describes the tools to be used for data collection and analysis. To Creswell and Clark (2007), instrumentation consists of the process of identifying, developing, validating and administering information collection tools in a given study. To Amin (2005), research instruments are meant to translate attributes or traits into quantities. According to Hopkins in Amin (2005), research instruments in education can serve four main purposes:

- **Instructional purpose**: This means it can provide a means of feedback for teachers and learners on progress, objectives, and performance after a teaching-leaning transaction.
- **Research and evaluation:** well-constructed instruments are used for collecting information to test innovations, and predictions. Constructed measures have been regularly used for evaluating the success of new programmes.
- **Guidance functions**: used by guidance counsellors for diagnosing learners' aptitudes and abilities so as to engage them for career options. This also permits learning and achievement adjustments.

- **Administrative purpose**: it facilitates better classification and placement decisions, and quality control.

In the case of this study, the purpose of instruments is for research (data collection and analysis). In this light, both quantitative (questionnaires) and qualitative (interviews) instruments are used in this study as presented below.

3.5.1. Quantitative Research Instruments

These are instruments for the collection of information and analysis in quantitative studies. They can also be referred to as instruments that allow for the collection of quantified information or numerical data. The most commonly used of these instruments is the questionnaire.

i. The Questionnaire

This is a carefully designed instrument for data collection based on the research questions and hypotheses. It consists of a set of questions to which the individuals made up of the sample, responds in writing (Amin, 2005). We can therefore say that a questionnaire constitutes a set of interrelated questions which seek to measure the variables of a study by constructing appropriate items through which data will be collected. A questionnaire should respect the following characteristics:

- Clear for respondents to read and understand the questions;
- Respondents possess the information to provide the right answers to questions;
- Respondents are willing to answer the questions objectively;
- Questions must reflect the variable;
- Questions should exactly measure what it was supposed to measure.

Two main forms of questionnaires are often used in research studies, which are the closed-ended and opened-ended questionnaires.

- **Open-ended questionnaire**

In the case of this study, the open-ended Likert scale questionnaire was used to get information from teachers. Moreover, the questionnaire was constructed based on the hypothesis, literature and theories.

The Likert scale proposes a five-category response continuum: strongly disagree, neutral, disagree, agree, and strongly agree. The advantage is that it is easy to construct and reduces the chances of respondents to answer with a prejudged or limited mind-set. The Likert scaled questionnaire used in this study also has an area for respondents to comment and to clarify their responses. It is for this reason that the questionnaire used in this study is an opened-ended one. This questionnaire was used to collect information from some secondary school graduates who are enrolled or studying at their first year in some departments in classical faculties in some state universities.

3.5.2. Qualitative Research Instruments

These are instruments used for the collection of qualitative information. It allows for flexibility during the question-and-answer session between the researcher and an individual or interviewee. Various types of interviews exist; they include:

- **Unstructured Interview:** According to Wilkinson and Birmingham (2003), the unstructured interview is "a very flexible approach. Areas of interest are established by the researcher but the discussion of issues is guided by the interviewee. This allows some control over the interview for both interviewer and interviewee. However, unstructured interviews can be difficult to plan (in terms of the time to be given to the event), they are difficult to 'steer' if the discussion gets away from the key subject matter, and they can prove extremely difficult to analyse".
- **Semi-structured interview:** There is "less flexibility with the semi-structured interview. The interviewer directs the interview more closely. More questions are predetermined than with the unstructured interview, though there is sufficient flexibility to allow the interviewee an opportunity to shape the flow of information", Wilkinson and Birmingham (2003),
- **Structured interview**: The structured interview is mostly considered as sometimes questionnaire that is completed face-to-face. "This is for the simple reason that the interviewer has control over the order of questions, all of which are predetermined. However, there is an element of predictability to the structured interview which allows the event to be timetabled with some precision (an interview scheduled to last an hour

will usually do so)" Wilkinson and Birmingham (2003). Unlike the other models for interviews, the structured interview may provide an easier framework for analysis.

It suffices to note that "it can be difficult to accurately distinguish between unstructured and semi-structured interviews, and the criteria for each may appear merely academic. However, there is agreement that unstructured interviews are controlled and directed by the interviewee, whereas semi-structured interviews have predefined areas for discussion. In the semi-structured interview, the format and ordering of the questions are informed by the ongoing responses of the interviewee to the questions posed", Wilkinson and Birmingham (2003). Based on the above literature on these various types of interviews that are being used in the collection of information in a study, the present study has opted for the semi-structured interview.

- **Semi-Structured Interview**

These are interviews that lie between structured and unstructured interviews because they contain elements of both (Wilkinson and Birmingham 2003; Amin, 2005). The level at which interviews are structured depends on the research topic or variable under study, the purpose, methodology standards, preferences and type of information sought. In the case of this study, semi-structured interviews were conducted to target officials from the Ministry of Secondary Education, secondary school administrators/principals and secondary school teachers.

3.5.3. Focus Group discussions

According to Anderson (1996), a focus group discussion is a carefully planned and moderated informal discussion where one person's idea triggers others, and brings a chain of reactions which are quite informative. It is also referred to as informative dialogue between more than two persons. It has as aim to address a specific topic, in in-depth in a comfortable environment to elicit a wide range of attitudes, opinions, perceptions, feelings, from group of individuals who share some common characteristics and experience in relation to the topic under study. Media focus group discussions was used in this study to obtain information from some officials from the Ministry of Secondary Education, secondary school administrators/principals and secondary school teachers since meeting them individually was not possible. These persons could easily be met in the Ministry of Secondary Education, as was the case of the officials in the ministry, and that of the various institutions as per the secondary school administrators/principals and teachers

who were in the staff room. It also permitted for the researcher to obtain a richer discussion session, deeper, more honest, and incisive.

According to Hess in Wilkinson and Birmingham (2003), there are five "Ss" that makes a focus group discussion interesting, they are:

- Synergy, meaning it is a cumulative process where by individual participants react to, and build upon others responses. The resulting combining effort will probably produce a wider range of deep information than any one-on-one interview will do.
- Snowballing, meaning that a comment by one triggers a chain of responses, which in turn generates new ideas and rich information on the topic under study.
- Simulation, meaning that other members are being spurred by others to express their views.
- Security, meaning that participants feel at home since they are similar in opinion, and other socio-professional issues. They cease to be shy, there by expressing themselves freely.
- Spontaneity, meaning that participants can react at their will, present their opinion, may agree or disagree with one another.

According Wilkinson and Birmingham (2003), a Focus Group Discussion has three stages which are:

- The opening section, which is the welcome, introduction section, and practical guides given.
- Questioning section.
- Closing section: telling participants thanks, giving them an opportunity to include another input, and telling how the data will be used

3.5.4. Validity of Research Instruments

A research instrument can be valid if it measures exactly what it was supposed to measure. This means that the content of the instrument should bring about the exact information it is designed for. In order to verify the validity of the questionnaires and interviews used in this study as principal instruments for data collection, the researcher constructed the first draft of these instruments and presented to her affinity peer group and to her supervisor. A cross examination of the questions and interview frames and measuring capacity, called on the researcher to pay

attention to the use of technical words or jargons so as to avoid them or to mention their meanings beside or in brackets. Appraisals were made by the supervisor while the researcher had to do the necessary corrections. A second appraisal by the supervisor, advised the researcher to avoid leading questions during interview. The instruments were then submitted for the last time of which they were approved by the supervisor as valid under face, construct and content, and therefore ready for field administration. Some important types of validity can be explained in this study:

- **Content validity of the research instrument:** This refers to the extent to which the content of an instrument corresponds to the content of the theoretical concept it is designed to measure (Amin, 2005). In this study, the questionnaire and interviews were constructed based on the conceptual and theoretical framework of the education system and development of skills for the digital economy. Thus, the researcher constructed items which are grounded in the indicators of the research variables. However, the content of these instruments measures ingredients digital policy design, content, methods (e-teaching skills), equipment's, e-governance, and skills for the digital economy.
- **Construct validity:** The construct validity of an instrument is based on the fact that the instrument reflects a particular construct to which are attached certain meanings (Cronbach, 1946 in Amin, 2005). It can also be described as the extent to which inferences can legitimately be made from the operationalization in your study to the theoretical frameworks on which that operationalization was made. In the case of this study, the construct validity of the questionnaires and interviews is judged in terms of the mode of operationalization in the study. This is strictly guided by the theoretical construct of this study which forms the basis of orientations on how to build the questionnaire and interviews.
- **Face validity** on its part simply presents a convincing physical picture and the recommended methodology of the instruments, giving the impression to an expert or reader that this instrument is appropriate for data collection in this study. As a result, the physical look of the questionnaire carried the institutional logo and header, the introduction, the body and conclusion. A sample of these instruments will be presented below.

All these aspects of validity were carefully examined in constructing the research instruments of this study. The research instruments were validated with use of the pilot technique.

3.5.5. Pilot Study

In every scientific study, it suffices for the researcher to avoid any doubts on the interpretation and understanding of items or questions by respondents. In this respect, before the final field administration of the instruments, the researcher proceeded with a pilot study to therefore confirm the effectiveness, articulation, and the appropriateness of the questionnaires and interview guides in extracting the right information from the respondents. However, this exercise was conducted with strict respect of the different profile of respondents involved in the sample population as follows: secondary school graduates enrolled or studying at their first or second year in some departments of some state universities, some secondary school administrators/principals, some secondary school teachers and selected officials from the Ministry of Secondary Education. The pilot testing respecting the following procedures:

- After developing the questionnaire and interview guide, they were presented to the supervisor for scrutiny. Key issues examined by the supervisor were the sufficient operationalization of the variables to provide the expected indicators (items). The language and length of the questionnaire, and interview guide were also verified.
- After this phase the questionnaires were administered to 865 secondary school graduates selected from the four state universities, randomly picked from nine departments.

3.5.6. Results from the Pilot Study

After the pilot phase, the researcher had to correct and pay attention to the following aspects for ameliorate such as:

- Reduce the length of the questionnaire as time taken to fill the questionnaire did not have to go above 30 Minutes;
- Long questions were summarized;
- Ambiguous questions were clarified by reformulating them and taking care of technical terms or complex vocabulary;
- Feedback on the interview pilot study confirmed that the recorder to be used by the researcher is good;

- Some items required to be more specific so as to target relevant responses and to avoid ambiguous responses;
- Abbreviations such as SDG, ICT on the questionnaires were written in full beside or in brackets.

3.5.7. Administration of Research Instruments

According to Yin (1994), the administration of a research instrument investigates the mode used by the researcher to get the respondents provide the required information either through questionnaires, interviews or observations. This can either be done via self-administration or direct administration, indirect administration or through another individual.

- To talk of **self or direct administration**, it refers to a scenario where by the research meets the respondents on a physical basis for them to answer the two either questionnaire or interview. The main advantage of this method is that the researcher orientates and clarifies the respondents on items which may not be understood by them. The presence of the researcher also instils some confidence on respondents that they are giving the information to the right quarters. On the other hand, this technique is disadvantageous due to the likelihood for the researcher to influence the respondents by over directing them on how and what to answer.
- To talk of the **indirect administration**, the researcher may relay the questionnaire via an intermediary individual or organization. Today, a new mode of administration has occupied the research field due to the advent of information technology. These instruments are administered through online format, via emails, or other messaging platforms for respondents to fill, and return. They include *survey monkey, Question pro, pyshData or Zumerang*. As mentioned earlier, two principal instruments were used in this study to collect data: Questionnaires (media groups) and interviews, which were all self-administration.

3.6. Technique of Data Analysis

This refers to the appropriate statistical test which allows for the researcher to either confirm or reject the hypothesis of the study. However, the nature of a study or variable determines

the type of statistical instrument to use in its analysis. Qualitative studies take on descriptive statistics or analysis such as content analysis, narratives, deductive analysis, discourse analysis, framework analysis, but to name a few. Since this study is made up of both qualitative and quantitative data, it therefore requires qualitative and quantitative techniques for analysis as seen below:

3.6.1. Qualitative Techniques for Data Analysis

This refers to the method used by the researcher to analyse information that cannot be easily quantified. This is often based on the form or content of data which demands for explicit or depth explanation of a problem or phenomenon. In many cases, qualitative data can be information from texts, books, newspapers, journals, articles, observations, interviews, opened-ended questionnaires, and focused group discussions. In the case of this study, the qualitative data is information from interviews. However, various techniques can be used in analysing qualitative data. According Wilkinson and Birmingham (2003) qualitative data can be analysed with the use of frequencies, means, and standards deviation. These authors furthered that in recent times, content analysis has been recommended by experts for qualitative data. Reasons being that this technique provides significant meaning to data. Principally, two main models of content analysis exist, which are conceptual or thematic analysis, and relational content analysis.

3.6.1.1. Conceptual or Thematic Content Analysis

This approach is the most popularly used by researchers. It examines the incidence or frequency of concepts (themes, issues, words, statements, expressions, etc.) in a text or discourse. In most cases, it quantifies the occurrences of the themes or concepts into frequencies, and percentages, dispersions, and standard deviations. However, the researchers focus on the number of times a word appears so as to make meaning. Under normal circumstances, the central point of content analysis is to make meaning out of themes, issues, and statements that are tied to the phenomenon under study.

Unfortunately, this model has been criticized for sometimes taking a quantitative turn, thus, not showing in satisfactory terms the inherent meanings in the words. In this light, (Berelson as cited in Wilkinson and Birmingham, 2003) argued that based on the fact that some quantification

has taken place, the real meaning of the data is overlooked in favour of frequencies. This has made this approach to be considered by some researchers as the quantitative content analysis.

3.6.1.2. Relational Content Analysis (RCA)

This approach is often considered as the qualitative content analysis. This approach identifies and explores relationship amongst themes and issues. Relationships between themes, issues, and statements are the focus of this model. Here, themes, statements, concepts and issues have specific meaning, and at the same time examined in terms of the links that exist among them. The RCA has eight stages as seen below.

i. **Deciding on the question:** Stating your question "explicitly at the beginning of your analysis gives focus to your work. Carefully crafted research questions can limit the number of themes and issues, and their types, to be explored, making the whole process more manageable". A question, or theme, suitable for relational analysis might be what is being said in a number of research studies or journal papers about teachers' job satisfaction.

ii. **Framing the Analysis:** When the question has been established, it is necessary to frame your analysis. In the case of this study, the four research variables (digital policy design, content, infrastructure and equipment, methods, skills) are the frames in this study.

iii. **Deciding the types of relationships that can be examined**: When "examining relationships between words, phrases or other units of analysis, a number of approaches are possible". These include:

- **Affect extraction**: "A relationship analysis based on affect extraction develops an emotional evaluation of themes and issues".
- **Proximity analysis**: "Proximity analysis" explores text for the presence of words or themes and determines their proximity to other (pre-defined) words or themes.
- **Cognitive mapping**: Often "cognitive mapping techniques result in a graphical representation of the linkages between words or concepts to provide a network of the relationships that exists" (Carley 1990).

iv. **Coding and categorizing the text or interview script: "**The decision about the type of analysis to perform will inform decisions about which words or concepts to code

and categorises. It might be decided to code for positive and negative comments made about the rate of digital transformation. In this case, the researcher would scan the text(s) or interviews script and classify words/comments as positive and negative", (Carley 1990).

v. **Exploring the relationships:** A number of tools are available in the relational analysis model that allows researchers to "explore linkages and relationships between words or concepts. The strength of a relationship can be displayed by examining words or concepts and establishing (given their location in the text, number of times used, association with the central theme or themes of the research, etc.) the clarity of the connections that may exist. It is often useful to display strength relationships in numerical form, ranging from (no relationship) to +1 (direct relationship)".

Another means of exploring relationships is to establish whether words of concepts are related at all. Often, using this exploratory tool, researchers determine the extent to which words or concepts are positively or negatively related.

vi. **Coding the relationships: "**This stage of analysis provides the main difference between conceptual analysis and relational analysis. While conceptual analysis focuses on the words or concepts, in relational analysis the focus is on the relationships between words or concepts. Therefore, the relationships themselves are coded under this analysis. Many codes and relationship permutations are possible – such as codes indicating weighting, codes indicating positive relationships and codes indicating negative relationships", (Carley 1990).

vii. **Analysis of the relationships:** Analysis of your coded information using a relational approach can involve extremely complex statistical techniques. For example, you can examine all your heavily weighted codes and seek to establish linkages between positive and negative words or concepts. Additionally, you may explore linkages to search for directional relationships. Does the existence of a coded word or phrase have an impact on subsequent coding? Does your coding suggest the existence of other factors or influences?

viii. **Mapping the relationships: "**Relational analysis allows a graphical representation of relationships. This is often useful when analysing your data and presenting it to others.

You can quickly establish the strengths and weaknesses of relationships, including positive and negative attributes, visually".

For the purpose of this study, conceptual or thematic content analysis will be used, while relationships between concepts and phenomenon's will be examined in the process. This signifies that, there is a mixture of thematic and relational content analysis used in this study.

3.6.1.3. Quantitative Techniques for Data Analysis

This refers to the use of inferential statistics in hypotheses testing. The statistical tests to be used in this study are the Pearson's Correlation and Multiple Regression Analysis. These tests are used to determine the link or relationship between two variables as seen below:

3.6.1.4. Pearson's Correlation

The Pearson's correlation will be used to test each research hypothesis, while the multiple regressions shall be used to determine the strongest predictor or predictors by rank.

Pearson's Correlation

It is used to determine the strength of relationship between the education system and the development of skills for the digital economy. It is given by:

$$r = \frac{\sum[x - \bar{x}](y - \bar{y})}{\sqrt{\sum[x - \bar{x}]^2}(y - \bar{y})^2}$$

Where **x** and **y** are individual samples, x, ȳ are means of the samples.

Correlation involves the measurement of association, or relationship, or correlation between two variables to ascertain whether they are positively or negatively related, or not related in any way whatsoever. Two variables are related if the changes in one variable affect or influence the changes in the other variable. To measure association or relationship between variables we use correlation coefficients to express the degree of association or relationship. In other words, correlation coefficients measure the strength (direction and magnitude) of association or relationship between two variables. Correlation coefficients can be high or low (magnitude), and positive or negative (direction). Correlation coefficients vary from -1 to +1: whereas -1 and +1 indicate perfect negative and perfect positive correlation coefficients respectively, a correlation

coefficient of 0 implies no correlation (zero relationship). Further, correlation coefficients lower than 0.40 (whether negative or positive 0.40) are said to be low, between 0.40 and 0.60 are moderate, and above 0.60 are high, (Carley 1990).

3.6.1.5. Multiple Regression Analysis

This is a test which goes beyond showing the degree of significance of a relationship between variables, to determine the variable(s) that highly predict(s) the variations on the dependent variable as compared to others. At a multi-level as in this study, we will use this test to show the variable(s) that predicts the most among digital policy design, e-governance, digitalization of content, teaching-learning framework, digital infrastructure and equipment framework, on the degree to which they predict the development of skills for the digital economy. Thus, will allow us to point out the strongest predicting factor of graduates' employability. This test is expressed as follows:

$$\hat{Y} = \beta 0 + \beta 1X1 + \beta 2X2 + \ldots + \beta pXp$$

Where **β** represents a set of coefficients in the sample population whose values are still to be determined.

This test is used in hypothesis testing in this study where the null hypothesis was tested to verify that a linear relationship can be used to predict values of the dependent variable and given values of the predictor variables. Likewise, the SPSS (Statistical Package for the Social Sciences) was used, which tested the regression level at α(alpha) = 0.05, to either accept or deny the linear significance of the relationship between the variables.

3.7. Variables of the Study

Research variables are considered as a characteristic that varies. It may change from one thing to another, from a quantity to another or from one quality to another which gives changing results in a research study. To Amin (2005) a variable can generally be defined as anything that can take on differing or varying values, which can differ at various times for the same object or person. Two main variables exist in this study, which are the independent and dependent variables. The education system is the independent variable of this study, while the development of skills for the digital economy is the dependent variable.

3.7.1. The Independent Variable: The Education System

This is the variable that the researcher manipulates to view its effects on the dependent variable. In other words, the education system is manipulated to determine the development of skills for the digital economy. According to UNESCO 2017, an educational system constitutes the dynamics put in place by a nation or particular people, with the goal of equipping them with holistic life and work skills. This can be linked to the changes it will bring in the education enterprise. In this study, it is operationalized in five sub variables as follows:

- Policy design;
- Programme/curriculum;
- Governance;
- Equipment;
- Teaching Methods.

3.7.2. The Dependent Variable: Development of Skills for the Digital Economy

This is the variable that carries the problem of the study. As a matter of fact, the development of skills for the digital economy refers to the qualities required for easy transition into the rather technological job market. According to Bernie and Charles (2009) these skills can be grouped under three domains:

- **Learning and innovation skills:** Critical thinking and problem solving, communication and collaboration, creativity and innovation);
- **Digital literacy skills:** (Information literacy, Media literacy, ICT literacy);
- **Career and life skills**: (Flexibility and Adaptability, initiative and self-direction, social and cross-cultural interaction, Productive and accountability, leadership and civic responsibility).

In a nutshell, this chapter examined the methodological tools used in this study. It is therefore worth noting that the mixed research approach has been used in this study with qualitative and quantitative designs used in the selection of respondents, designing of research tool for information collection, analysis, and hypotheses tests. The chapter has equally succinctly presented the area of study, and the research variables. It therefore suffices to mention that it is a correlational study which seeks to investigate the degree of correlation between the education

system and the development of skills for the digital economy, on secondary school graduates at their first year in some departments in classical faculties of selected state universities in Cameroon.

Table 21: SYNOPTIC TABLE OF HYPOTHESES, VARIABLES, INDICATORS AND MODALITIES (Researcher, 2023)

General research Hypothesis	Specific Research hypotheses	Independent variable	Indicators	Dependent variable	Indicators	Modalities	Research instruments	Statistical tests	Scale of measurement
the education system significantly influences the development of skills for the digital economy amongst secondary school learners in Cameroon	**RH1:** There is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.	**IV1**: Policy design	-Existence of a relevant policy -Policy goals -Design of an implementation plan -Access, equity and inclusion -Partnership between the education planners and the business world -Monitoring and evaluation mechanism	Development of skills for the digital economy amongst secondary school learners in Cameroon	-Human skills -Digital building block skills -Business enabler skills .	-Strongly agree. - Agree -disagree -Strongly disagree.	Questionnaire Semi-structure interview. - Media focus group discussion	-Pearson correlation and - multiple regression Analysis. -Thematic content analysis	Interval scale

			-sustainability -SMART (Specific, Measurable, Achievable, Realistic and Time-bound)						
	RH2: There is a significant correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon.	**IV2:** programmes and curricula design**.**	- Objectives -Elements of digital economy -Digital economy content as co-curriculum -Digital economy content as mainstream - Curriculum/course design for digital	Development of skills for the digital economy amongst secondary school learners in Cameroon	-Human skills -Digital building block skills -Business enabler skills .	- Strongly agree - Agree - disagree - Strongly disagree	Questionnaire Semi-structure interview. - Media focus group discussion	-Pearson correlation and - multiple regression Analysis. - Thematic content analysis	Interval scale

			classrooms (online learning) -Partnership with the labour market sector on programme/curriculum development -Theoretical Vs Practical - Adaptation to learners with disabilities						
	RH:3 There is a significant correlation between governance/Policy implementatio	**IV3:** Governance/Policy implementation	-Development of implementation plan -Decision-making -E-governance	Development of skills for the digital economy amongst secondary school	-Human skills -Digital building block skills	- Strongly agree. - Agree. - disagree	Likert scale Questionnaire Semi-structure	Correlation analysis and - multiple regression Analysis.	Interval scale -

	n and the development of skills for the digital economy amongst secondary school students in Cameroon.		-Leadership styles -Transparency and accountability -Sustainability (finance and maintenance) -Resource mobilisation -Monitoring and evaluation	learners in Cameroon	-Business enabler skills .	-Strongly disagree	d intervie w.		
	RH4: There is a significant correlation between equipment and the development of skills for the digital economy	**IV4:** Equipment/infrastructure	-Strategies to source for equipment -Existence of 21st century teaching equipment (classroom environment)	Development of skills for the digital economy amongst secondary school learners in Cameroon	-Human skills -Digital building block skills -Business enabler skills .	-Strongly agree. - Agree. -disagree -Strongly disagree	Likert scale Questionnaire Semi-structured intervie w	Correlation analysis and multigression analysis.	Interval scale

	amongst secondary school students in Cameroon.		-Availability of hardware devices -Availability of software devices -Connectivity to the learning environment -Energy equation (electricity) -Possession of technological devices by key stakeholders in the teaching environment -Presence of multimedia -Presence of ICT tools						

			adapted to people with disabilities						
	RH5: There is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon.	**IV 5: Teaching methods**	-Learner-centred approach -Competence-based learning -Project-based learning -Problem-based-learning -Inquiry-based learning -Blended learning -Pure online learning -ICT competences for teachers	Development of skills for the digital economy amongst secondary school learners in Cameroon	-Human skills -Digital building block skills -Business enabler skills	-Strongly agree. - Agree. -disagree -Strongly disagree	Likert scale Questionnaire Semi-structured interview.	Correlation analysis and -multiple regression Analysis.	Interval scale -

PART TWO: OPERATIONAL AND STRATEGIC FRAMEWORKS FOR THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY IN CAMEROON SECONDARY EDUCATION

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF PRIMARY DATA FROM CAMEROON SECONDARY EDUCATION SUB-SECTOR

This chapter is divided into three main parts: the first part deals with the presentation of interviews and participant observation, the second part presents frequency tables, whereas the third lays emphasis on the verification of the hypotheses. In that light, the Pearson Product-moment correlation will be used to verify the research hypotheses. These aspects are seen below.

4.1. Presentation and Analysis of Interviews

This section of the study presents and analyses the interviews collected from the field. The technique used to analyse interview in this study is a mixture of the thematic content analysis and content analysis. This technique aims at analysing themes and concepts to bring out their deep meanings in a bid to establish meaningful relationships between them. This tool will permit the researcher to establish the deep meanings and relations in the responses by the interviewees. It suffices to mention that the various categories of respondents interviewed in this study include: officials at the Ministry of Secondary Education, regional inspectors, and officials at the Distance Learning Centre . Their interviews have been presented as seen below.

4.1.1. Interview with officials at the Ministry of Secondary Education (MINESEC)

MINESEC01: Inspector General No 1.

Location: The General Inspectorate, Ministry of Secondary Education, Yaoundé, Cameroon

Interviewer: The researcher, Engozo'o (EN)

Interviewee: The Inspector General of Education (IGE)

Gender : Male

Age : 54 years

Date: February 15, 2023

Interview start time: 11:30 am.

Interview end time: 12:42 pm.

EN: Good morning, Mr Inspector General and thank you for giving us your precious time to talk about the development of skills for the digital economy in the Ministry of Secondary Education.

Please, can you edify us about the existence of a comprehensive policy framework for e-leaning in your ministry?

IGE01: You are welcome, Mr Engozo'o.

First of all, let's acknowledge the fact that there exists a policy that mentions the integration of ICT in secondary education in Cameroon. I think this is evident in Law no. 98/004 of 14 April 1998 to lay down guidelines for education in Cameroon. However, other policy documents such as the 2035 vision, the 2030 National Development Strategy, and the document for the digital economy in Cameroon equally define pathways for the integration of ICT in secondary schools. However, ICT policies in secondary Education have remained a theory until recent efforts to implement them. The creation of the Distance Learning Centre for secondary schools is evidence. Another problem to mention is that these policies and reforms are not quite holistic. This means they come from many national development policy documents and reforms, thus, making its interpretation and implementation difficult. We know about these policies and reforms, but they come from so many national development documents. At times we are confused on which to exploit, targets and times often overlap most of the times.

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

IGE01: *What I will tell you is that the implementation of these reforms has been slow or very mild for the past years. However, things have changed as you can see, we now have computer laboratories in many secondary schools, ICT and computer sciences are being studied as core subjects, and there exists a distance learning centre, well equipped with modern educational technology equipment. This centre is functional as we speak, and teachers are being recycled on how to teach online.*

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

IGE01: *It is difficult to say the curriculum practically aligns with the demands of today's digital economy. When we look into the high school curriculum, we will realize that these skills are mentioned in the learning targets. Worthy of note is that, what can be brought in as a lapse are the practical requirements for the development of these skills on students. However, there is a need to redesign this curriculum to match the skills for the digital economy as prescribed by UNESCO (2017). It suffices to note that this curriculum still largely talks about using ICT for learning, which is just a stride in 21st century skills.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

IGE01: *... permit me say that the one-student-one laptop initiative and the cyber education project have been some considerable ones as they at least triggered the presence of computers in schools in the last three decades. Mr Engozo'o, if I have to be realistic, I must confirm to you that the state of equipment: modern computer laboratories and ICT tools in the classroom is not that bad. Though, this assertion is largely different between urban and remote schools, priority education zones and non-priority education zones, regions, divisions and subdivisions, with schools at the urban centre being favoured (the teachers/computer ratio and the students/computer ratio can confirm that). It therefore follows that the creation and equipment of computer laboratories in secondary schools still remains and ongoing project of the ministry. To sum up I can say there is much to be done in terms of equipping our secondary schools with modern educational technologies.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivering of courses with new technologies? Comment on the teaching methods used by those teachers.**

IGE01: *This is a tough one, as it is seemingly new to the majority of our teachers. As a matter of fact, our teachers are yet to get immersed in the use of technology for curriculum design and delivery. Despite the adoption of e-learning as a major course at the Higher Teachers' Training Colleges around the country, graduating teaching professionals still demonstrate lapses in the use of ICT in course delivery. More worrying is the new pedagogic skills required by teachers to create digital content, and to teach online. However, there exists reskilling, capacity development and capacity building sessions for teachers carried out by the ministry in this aspect. It is*

ongoing and we hope to update our teachers to the demands of 21st century teaching. With regards to the teaching methods, some teachers go with blended learning models, few can do the pure online model, while most have remained with the traditional face-to-fact teaching method. This is really a call for concern as today's teaching has largely brought technology at the centre.

MINESEC02: National Coordinating Inspector in charge of Pedagogy and Computer Sciences (NCICS)

Location: The Inspectorate, Ministry of Secondary Education, Yaoundé, Cameroon
Interviewer: The researcher, Engozo'o (EN)
Interviewee: The National Inspector in charge of Pedagogy Computer Sciences (NCICS)
Gender : Male
Age : Not Applicable
Date: February 16, 2023
Interview start time: 10:30 am.
Interview end time: 12:30 pm.

EN: Good morning, Mr Coordinating Inspector and thank you for giving us some minutes of your precious time to talk about the development of skills for the digital economy in your Inspectorate.

Please, would you mind edifying us on the existence of a comprehensive policy framework for e-leaning in your ministry?

NICS: *Thank you for putting this question to me. What I would like you understand is that ICT education policies come from both national and international sources. Policies at the national scale are generally an implementation of international conventions signed by the country, whereas it is the duty of the nation to develop policies that fall within our context. Mr Engozo'o, … I will tell you that there exist comprehensive policies of ICT integration in the teaching learning process, but for the fact that these policies and reforms are not quite holistic. This means they come from many national and international development policy documents and reforms, thus, making its interpretation and implementation difficult. At times, we are confused of which to exploit, targets and times often overlap most of the times. To sum up I can confirm the*

existence of e-learning policies and reforms such as that which recently created the distance learning centre for secondary school during the Covid-19 pandemic peak.

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

NICS: *Thank you for asking this important question. On the state of implementation of these policies and reforms, permit me say that it has not been a bed of roses. The extent to which these policies are being felt on the ground is actually limited, either due to insufficiency of resources or a ready environment to facilitate their implementation. For instance, the strategy for implementation laid down by the 2007 National ICT development policy focused on variables like: Infrastructure and Readiness; Training; Utilising ICT in the Curriculum; Sustainability, Maintenance and Support; and Evaluating ICT Initiatives. However, the necessary dispositions to get this into full practice has not been in place for the past years. However, things have turned around in recent times as the creation of more computer laboratory in schools, and the training of teachers on the use of ICTs in the teaching-learning process has accelerated across secondary/high school teachers all over the country.*

To talk of e-governance, I can say that we have been using basic email services, and social media to communicate and coordinate personnel and their activities for the meantime. However, an in-house platform for the management of MINESEC personnel is yet to be built.

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

NCICS: *Yes, Mr Engozo'o, the high school curriculum is to an extent relevant in the development of 21st century skills. I can point out a skill like "communication", which is being developed on these students. In more recent times, the ministry has come with the creation of Technical and Vocational Secondary schools. This is a move to get teaching-learning more tailored to the exigencies of digital economy. despite being offered by very few schools; it is a reform that has seen a twist in the design. It suffices to note that this curriculum still largely talks about using ICT for learning, which is just a stride in 21st century skills. However, the old general education curriculum that still exists in high schools and requires to be redesigned to meet the skill demands of the digital economy.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

NCICS: *... The problem of modern digital equipment has always been a standing in our schools. Despite the efforts made by the Government and her technical and financial partners to invest in ICT infrastructure in schools, a wide gap still exists. The one-laptop-per-child project and the school cyber education initiative saw the equipment of an estimated 100 secondary schools in urban areas in the country. It suffices to note that this number of schools is largely insignificant to the hundreds of high schools that exist in the country. The teacher - laptop and student - laptop ratios are yet to be improved. This is an indication that the ICT equipment dilemma remains an equation to be resolved.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

NCICS: *The ICT teaching methods are still a difficult venture for teachers at this digital age. From my observation majority of these teachers still largely use the face-to-face teaching method. It was only during the peak of the Covid-19 that all the teachers were obliged to use WhatsApp to deliver courses. Some used the blended learning model as well. It's important to note that there exists a great lapse in this area, hence requiring more efforts to be invested in.*

MINESEC03: National Coordinating Inspector in charge of Sciences and Coordinator of the Distance Learning Centre (NCIS)

Location: The Distance Learning Centre, Yaoundé, Cameroon
Interviewer: The researcher, Engozo'o (EN)
Interviewee: National Coordinating Inspector in charge of Sciences and Coordinator of the Distance Learning Centre (NCIS)
Gender : Male
Age : 56
Date: February 15, 2023
Interview start time: 10:30 am.

Interview end time: 12:30 pm.

EN: Good morning, Mr Coordinating Inspector and thank you for giving us the possibility to talk about the development of skills for the digital economy in the Distance Learning Centre under your Inspectorate.

Please, would you mind edifying us on the existence of a comprehensive policy framework for e-leaning in your ministry?

NCIS: *Thank you Mr Engozo'o for this question. There is a good number of both national and international policies. And Cameroon at large and the Education and Training Sector in particular endorsed those policies. The only problem is that those policies have not yet been exploited to shape a policy document for the Education and Training Sector. Mr Engozo'o, … I do believe that a national vision of digital education may give more impetus and will guide the various actors of each subsector on what they are supposed to do. This national policy shall constitute the roadmap of digital education in Cameroon. To sum up I can confirm the existence of e-learning reforms such as that which recently created the distance learning centre for secondary school during the Covid-19 pandemic peak.*

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

NCIS: *Thank you for putting this important question. As I said earlier, the myriad of international and national policies make it somehow difficult once we are on the field. The extent to which these policies are being felt on the ground is actually limited, either due to lack/insufficiency of resources or a ready environment to facilitate their implementation. For instance, the strategy for implementation laid down by the 2007 National ICT development policy focused on variables like: Infrastructure and Readiness; Training; Utilising ICT in the Curriculum; Sustainability, Maintenance and Support; and Evaluating ICT Initiatives. However, the necessary dispositions to get this into full practice has not been in place for the past years. If we have a governance framework applied to the education system, we shall know which action to take in a low, mid or long term all over the country.*

To talk of e-governance, I can say that we have been using and we still use basic email services, and social media to communicate and coordinate personnel and their activities for the meantime. I do believe that with time, a better platform shall be put in place for more secured communications and actions.

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

NCIS: *Yes, Mr Engozo'o, the secondary school curriculum is to an extent relevant in the development of 21st century skills. It is clear that some human skills like communication, collaboration and critical thinking have a solid foundation in courses like: language, philosophy and history. For us to get teaching-learning more tailored to the exigencies of digital economy, there is urgent need to revamp our curricula and programmes by including the development of all the 14 skills for the digital economy. It suffices to note that this curriculum still largely talks about using ICT for learning, which is just a stride in 21st century skills.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

NCIS: *… As freshers in the domain of digital education, the problem of modern digital equipment is palpable in our schools. Despite the efforts made by the Government and the partners to invest in ICT infrastructure and equipment, a wide gap still exists. The students-computer and the teacher computer ration still stand at 33/1 and 6/1 respectively. These national pictures hide regional, divisional and subdivisional disparities. We have to improve them. Also, the energy equation is still at a very low scale.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

NCIS: *There are teachers who perform perfectively well. But how many are they? The others (majority) have so many difficulties from the pre-service training to the classroom. From my observation, this majority still largely use the face-to-face teaching method. Some use the blended learning model as well. It's important to note that there exists a huge gap in this area, hence requiring more efforts to bridge them.*

MINESEC04: National Pedagogic Inspector.

Location:	The Inspectorate, Ministry of Secondary Education, Yaoundé, Cameroon
Interviewer:	The researcher, Engozo'o (EN)
Interviewee:	The National Inspector in charge of Computer sciences (NICS)
Gender :	Female
Age :	Not Applicable
Date:	February 17, 2023
Interview start time:	11:30 am.
Interview end time:	1:30 pm.

***EN**: Good morning, Mrs National Inspector and thank you for permitting us to be part of your busy agenda today to talk about the development of skills for the digital economy in the Ministry of Secondary Education.*

***Please,* can you edify us on the existence of a comprehensive policy framework for e-leaning in your ministry?**

NICS: *You are welcome, Mr Engozo'o and thank you for this first question.*

What I would like you to take note of is that ICT education policies come from both national and international environments. Policies at the national environment are most often the implementation of international conventions endorsed by the country, whereas it is the duty of the nation to develop policies that fall within our context. Mr Engozo'o, … I will tell you that there exist comprehensive policies of ICT integration in the teaching-learning process, but these policies and reforms are not quite holistic. This means they come from many national and international development policy documents and reforms, thus, making their interpretation and implementation difficult on the field. Generally, we are confused on which to exploit, and the various targets make the whole thing difficult. To sum up, I can say without hesitation that the existence of e-learning policies and reforms such as the one which recently created the Distance Learning Centre for secondary school students during the Covid-19 pandemic outbreak.

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

NICS: *Thank you for asking this important question. On the state of implementation of these policies and reforms, permit me say that it has not been a long and calm river all along. The extent to which these policies are being felt on the ground is actually limited, either due to insufficiency of resources or a ready environment to facilitate their implementation. For instance, the strategy for implementation laid down by the 2007 National ICT development policy focused on variables like: Infrastructure and Readiness; Training; Utilising ICT in the Curriculum; Sustainability, Maintenance and Support; and Evaluating ICT Initiatives. However, the necessary dispositions to get this into full practice have not been put in place for the past years. However, things have turned around in recent times as the creation of more laboratories in schools, and the training of teachers on the use of ICT in the teaching-learning process has accelerated across secondary/high school teachers all over the country.*

In terms of e-governance, I can say that we have been using social media, and basic email services to communicate and coordinate personnel and their activities for the meantime. However, a platform for the management of MINESEC personnel is yet to be built.

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

NICS: *yes, Mr Engozo'o, the high school curriculum is to an extent relevant in the development of 21st century skills. You can agree with me that skills like critical thinking is being developed on these students when they study philosophy. In more recent times, the ministry has come with the creation of the speciality of ICT in some private and government secondary schools, from Lower Sixth and Première, respectively for the anglophone and francophone subsystems. This is a move to get teaching-learning more tailored to the exigencies of digital economy and to get more skilled graduates. Despite the fact that very few schools offer this training, it is a reform that has seen a twist in the design. It is important to note that this curriculum still largely talks about using ICT for learning, which is just a stride in 21st century skills. However, the old general*

education curriculum that still exists in high schools requires to be redesigned to meet the skill demands of the digital economy.

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

NICS: *… The problem of modern digital equipment has always been a standing in our schools. Despite the efforts made by national and international governments to invest in ICT infrastructure in schools, a wide gap still exists. The school cyber education initiative equipped an estimated 100 secondary schools in urban areas of the country. It suffices to note that this number of schools is largely insignificant to the hundreds of secondary high schools that exist in the country. The teacher - laptop and student - laptop ratios are yet to be improved. This is an indication that the ICT equipment problem remains an equation to be resolved.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

NICS: *The ICT teaching methods are still a difficult venture for teachers of this digital age. From my observation the majority of these teachers still largely use the face-to-face teaching method. It was only during the peak of the Covid-19 that all the teachers were obliged to use Telegram and WhatsApp to deliver courses. Some used the blended learning model as well. Also, there exists a great lapse in this area, hence requiring more efforts to be invested in.*

4.1.2. Summary Analysis of Interviews with official at the Ministry of Secondary Education

Based on the wording of some key officials at MINESEC, the observations or meanings can be made:

- Firstly, these officials confirmed the existence of a multitude of both external and internal policies that guide the presence of technology in education and skills development in secondary/high schools in Cameroon. According to these respondents, these policies are relevant, though may require some slight revisions or simple reforms to get them aligned to the exigencies of the digital economy. It is however clear from these words that a wide range of digital policies exist in this ministry, but there is an absolute need to develop a national policy document on digital

education with a unique vision for the Education and Training Sector. Every subsector like the Ministry of Secondary Education will then know their development plan, budget and the roles of each structure in the development of digital skills.

- Secondly, on the topic of policy implementation, these officials unlike many others confirmed this as the core problem, while attributing the gap to lack of commitment of some administrators or managers, and also to insufficiency of resources. This signifies that the human factor in piloting these policies to achieve the expected goals is a problem, reason for the requirement of checks and balances before choosing these implementers. Also, the question of shortage of resources, is an old one as economists often put it that "resources will always be scarce or insufficient, hence, more should rather be invested on responsible and tactful management of these resources."
- Thirdly, regarding the question of the availability of modern digital infrastructure and equipment in schools, these officials reported that most secondary/high schools, particularly in urban cities have been equipped with computers, and a functioning internet. However, it should be noted that majority of these schools found in semi-urban and remote areas are yet to have access to a computer. This simply means that the state of modern digital equipment in secondary schools in Cameroon requires more attention.
- Last but not the least, on the question related to teachers' ICT-teaching skills, these officials noted that our teachers are quite lagging in terms of these skills. However, they made mention of significant efforts by the ministry to upskill these teachers via capacity development/building workshops and in-service trainings. The words of these officials clearly pointed out that secondary/high school teachers are still lagging in terms of ICT-pedagogy skills for today's classroom. As a result, using technology to prepare and deliver lessons is not a culture in our classrooms. Also important is to note that both teachers and students will develop digital skills as they frequently manipulate technology gadgets during the teaching-learning process.

4.1.3. Interviews with regional inspectors in charge of pedagogy and computer sciences

RICS01: Regional Inspector.

Location: The Inspectorate, Regional Delegation for Secondary Education for the Far-North, Maroua, Cameroon

Interviewer: The researcher, Engozo'o (EN)

Interviewee: The Regional Inspector in charge of Computer sciences (RICS 01)

Gender : Male

Age : Not Applicable

Date: February 21, 2023

Interview start time: 12:30 am.

Interview end time: 2:30 pm.

EN*: Good morning, Mr Regional Inspector and thank you for permitting us to talk about the development of skills for the digital economy in the Ministry of Secondary Education.*

Please, can you edify us about the existence of a comprehensive policy framework for e-leaning in your ministry?

RICS01: *Thank you for the question. There exist many policies that determine the insertion of technology in education in Cameroon. If you have looked into the main education policy in this sector of education the Education and Training Sector Strategy Paper for instance, you will realize that it specifies on the use of technology in teaching. Also, we have had many reforms over the years that, both nationally and internationally that have increased the dose of usage of technology in the teaching-learning process. The fact that the implementation of these policies has been slow does not mean they don't exist. What we should be talking of is how to improve on these policies and to accelerate the implementation task.*

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance*?***

RICS01: *As I mentioned in your former question, the implementation of the existing policies has been the main problem blocking the full flesh integration of technology in education in Cameroon. if the right action towards implementation of these policies had been taken by those in charge, we would have gone further.*

To talk of e-governance, I can say that we have been using basic email services, and social media like WhatsApp, Facebook, Telegram to communicate and coordinate personnel and their activities for the meantime. It should be noted that there is still need for specific platforms for a better coordination and management of our personnel.

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

RICS01: *thank you very much for asking this question. What I will tell you is that the general education curriculum is highly theoretical because there is the absence of professional incentives or hands-on practice. However, this introduction of computer sciences in the school curriculum since 2001 has seen an increase in the development of ICT knowledge on students amid the fact that very few of these schools can boast of computer or multimedia centre. ...Mr Engozo'o, I can tell you that there is some kind of relevance, but to a lower extent. It is for this reason that I think there is a need to review and or redesign the school curriculum in order to align it to today's job market demand.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

RICS01: *... Mr Engozo'o, the problem of well-equipped computer labs or multimedia centres has always been at the centre of the initiative to integrate ICT in the teaching-learning process in secondary school in Cameroon. I can tell you the situation is worst here in the Far-North. As a matter of fact, we cannot count 15 secondary-high schools with a well-equipped digital infrastructure. This then poses the question of how will digital skills be developed on students who have neither seen nor manipulated a computer before? Even the famous cyber education project and the one-laptop-per-child project did not deter with the problem of equipment in these schools.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

RICS01: *Thank you once more for this question. What I can tell you is that our teachers are still very much attached to the traditional pedagogy which they learnt at the Higher Teacher Training Colleges. It is a gradual process as the teachers themselves have come to realize that it is a must to be acquainted or familiarize with the use of technology to prepare and deliver their courses. Also, permit me to say that not all the teachers are totally empty in this light. You must bear with me that the advent of the COVID-19 ushered in technology as the solution to enhance continuous learning. It is from this period that many teachers saw that they need to jump to upskill in techno-pedagogy. To conclude, I will tell you that the ministry has begun organizing training sessions to get teachers upskilled in the use of technology in preparing and delivering their courses. It is a gradual process.*

RICS02: Regional Inspector.

Location: The Inspectorate, Regional Delegation for Secondary Education for the South-West, Buea, Cameroon

Interviewer: The researcher, Engozo'o (EN)

Interviewee: The Regional Inspector in charge of Computer sciences (RICS 02)

Gender : Male

Age : Not Applicable

Date: February 23, 2023

Interview start time: 9:30 AM.

Interview end time: 11:30 AM.

EN*: Good morning, Mr Regional Inspector and thank you for permitting us to talk about the development of skills for the digital economy in the North-West region in particular and in the Ministry of Secondary Education at large.*

Please, **can you edify us about the existence of a comprehensive policy framework for e-leaning in your ministry?**

RICS02: *Thank you for asking this question. What I will tell you is that many policies exist to determine the integration of ICT in the teaching-learning process. Beginning with the*

law of orientation, the sector-wide approach to education, and specific reforms. We also have international conventions that directly or indirectly influence e-learning in the education sector in Cameroon. what I will tell you is that these policies actually exist, but are least implemented.

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

RICS02: *This question really targets the real problem in Cameroon education system. What I will tell you is that implementation remains the biggest blow to achieving policy goals in Cameroon. The will can be there, but the resources are often insufficient.*

To talk of e-governance, we use WhatsApp, Facebook, Telegram for our communication, coordination and exchange of information that help each other. Except you mean something else.

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

RICS02: *Mr Engozo'o, what I can tell you is that the curriculum does not match the needs of the job market. It is very easy to read from the number of high school graduates who move to the university simply because they could not find a job with their G.C.E. A. level or Baccalaureate. While others become hawkers around the urban markets. This is a solid yard stick that measures the strength of the curriculum in terms of relevance. In brief, we can conclude that this curriculum requires to be redesigned so as to match to the exigencies of today's job market or the digital economy.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

RICS02: *Thank you for this question. I will tell you that this is the heart of the problem because we cannot develop digital skills on students without well-equipped computer laboratories or modern multimedia centres. Both teachers and students do not even have computers, how do you expect us to proceed? It is really a big problem all over the South-West region. With the on-going social crisis, things have worsened. Many computer laboratories have been set ablaze; many offices were broken and some schools have been completely burnt. This state of affairs has really deteriorated the teachers/computer and the student-computer ratios within the region. Also important*

is to note that there are localities in the "red zone" where electricity, network and internet do not work. I do believe that if there was a regional distance learning centre, we could better handle the continuity of education within this context. The Yaoundé Distance Learning Centre is a good initiative that should be supported by regional centres.

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

RICS02: *Mr Engozo'o, it is true that having educational technology skills is critical to cope with today's classroom. Therefore, today's teachers are required to have these skills. From my personal observation, I will tell you that our teachers are still buried in the traditional face-to-method. Most of them do not worry preparing their lessons byy using technology resources, not to mention using these resources to deliver the courses. However, I have observed an increase interest in upskilling and cultivating this technology culture.*

RICS03: Regional Inspector.

Location: The Inspectorate, Regional Delegation for Secondary Education for the Littoral, Douala, Cameroon
Interviewer: The researcher, Engozo'o (EN)
Interviewee: The Regional Inspector in charge of Computer sciences (RICS 03)
Gender : Female
Age : Not Applicable
Date: February 24, 2023
Interview start time: 9:30 AM.
Interview end time: 11:30 AM.

EN*: Good morning, Mrs Regional Inspector and thank you for giving us room to talk about the development of skills for the digital economy in the Ministry of Secondary Education.*

Would you mind **edifying us on the existence of a comprehensive policy framework for e-leaning in your ministry?**

RICS03: *I appreciate such a question in times like this… Mr Engozo'o, there actually exist some policies that guide the use of technology in the teaching-learning process in secondary schools in Cameroon. However, my take on the evolution of things is that the ongoing reforms in the ministry have managed to get us moving, but this is practically insufficient as the changes that technology brings on a daily basis are wanting. For this reason, I will tell you that a good number of policies exist, but need to be revised and reshaped at the educational dimension in order to match present day skills development exigencies.*

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

RICS03: *Thank you for asking this question. This has been the core problem with policy issues in Cameroon (Policy Implementation). Even if the policy is well designed, it can never be a beautiful policy if it cannot achieve the goal(s) it is intended to if not well implemented. Reason for me to say that more is required to be done in terms of implementing the said policies.*

My take on e-governance is that the ministry is really trying, but we are still at the ground level since specific and professionally designed platforms for better management of work and staff are yet to be designed.

EN: **What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?**

RICS03: *Mr Engozo'o, thank you for this question. The secondary education curriculum respects the competence-based approach which rests in the fact that what is taught in class should develop problem resolution skills in everyday life of the learner. For this reason, I can say that the curriculum is relevant to the exigencies of the job market. Since you concentrate more on skills for the digital economy, there is the computer science subject and other scientific and arts disciplines that prepare students for the world of work.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

RICS03: *Thank you for this question. Despite some increase in the construction and equipment of computer laboratories in some secondary/high school in the Littoral region, there is still need for modern computer infrastructures and equipment. For instance, majority of secondary/high school are yet to own computer laboratories. Also, classroom and campuses in general do not have steady and speedy internet connection.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

RICS03: *Mr Engozo'o, our teachers have not yet cultivated a technology-based culture in their teaching practices. May be, probably because it was not an obligation before and during the COVID-19 outbreak. Now, the use of technology in preparing and delivering courses has become a must. As an inspector, we have since 2021 embarked on upskilling teachers with the use of technology in course preparation and delivery. The teachers are still lagging behind with pedagogic skills issues, but efforts are brought doubled by the ministry to improve on the situation.*

RICS04: Regional Inspector.

Location:	The Inspectorate, Regional Delegation for Secondary Education for the Centre, Yaoundé, Cameroon
Interviewer:	The researcher, Engozo'o (EN)
Interviewee:	The Regional Inspector in charge of Computer sciences (RICS 04)
Gender :	Male
Age :	Not Applicable
Date:	February 27, 2023
Interview start time:	9:30 AM.
Interview end time:	11:30 AM.

EN*: Good morning, Mr Regional Inspector and thank you for giving us the possibility to talk about the development of skills for the digital economy in the Ministry of Secondary Education.*

Would you mind **edifying us on the existence of a comprehensive policy framework for e-leaning in your ministry?**

RICS04: *Thank you very much for this question. There actually exist a multitude of policies and reforms that guide the e-leaning in secondary education in Cameroon. The sector wide approach reforms constitute a major policy. However, new trends in teaching and learning, and the exigencies of today's job market are strong indicators to conclude that these policies need some deep revision. It also suffices to note that recent efforts by the ministry are glaring as the distance learning centre created in Yaoundé for online courses is a significant step.*

EN: **Can you comment on the state of implementing this policy, if it really exists? What about e-governance?**

RICS04: *thank you for asking this question. Policy implementation or better still policy governance is a more of a problem in the process of achieving fixed goals. The whole process of implementation from planning to evaluation requires tact and commitment. High management skills are required to better implement the said policies. There is also the question of insufficiency of resources to ease the implementation process.*

To talk about e-governance, schools and the ministry most communicate using social media platforms like WhatsApp, Facebook, Telegram, etc... However, I think there is more to be done in this sphere.

EN: **What is your opinion on the relevance of the curriculum content in relation to developing digital economy skills?** *however, my take on the evolution*

RICS04: *Thank you for this question. It has been a song that the secondary curriculum is not relevant to job market skills demand. Mr Engozo'o, you can bear with me that we are not at zero. What I mean by this is that graduates from high school have some foundation at least, which permit them to go for continuous learning, professional training or apprenticeship. I must also concur to the fact that the general education curriculum in particular needs to be specifically tailored to the skills of the digital economy.*

EN: **What is the state of digital teaching-learning infrastructure and equipment?**

RICS04: *Thank you for this question. Some of these secondary high school students have well equipped computer laboratories, whereas others do not even have at all. What is most disturbing is the ownership of individual computers by both teachers and students. There is also the absence of internet on the school campus. The question that comes to my mind is if digital skills can be developed when both teachers and students do not have access to learning technologies.*

EN: **What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.**

RICS04: T*his is a very pertinent question. This is because teaching –learning today has largely shifted towards technology. This therefore means that today's teachers are required to possess e-learning skills in other to cope with this classroom. My observation is that very few teachers are embracing this new trend in teaching. However, the advent of the COVID-19 has made it a must for teachers to acquire ICT-Pedagogic skills before qualifying for the classroom.*

4.1.4. Summary Analysis of Regional Inspectors' Interviews

A detailed follow-up of the wordings of regional inspectors in charge of pedagogy and computer sciences can be interpreted in a summary statement as follows:

- Firstly, all four Regional Inspectors interviewed accorded that there exists a handful of major policies and reforms guiding the use of technology in the teaching-learning process in secondary schools. These inspectors further agreed that these policies are good, but required to be revised in order to align with the exigencies of today's digital economy. However, most of these inspectors pointed out that the creation of a distance learning centre in Yaoundé is a bold step in the fight toward digital transformation of education in Cameroon. We can deduct from these wordings that there is an urgent need to review existing e-learning policies within the ministry of secondary education.
- Secondly, on the topic related to policy implementation, these inspectors posited that one of the issues to worry about is policy implementation. In this light, all four cried out that insufficient resources to ease policy implementation is what is plaguing secondary schools. Moreover, the questions of goodwill, commitment, and management skills were

evoked by some of these inspectors, saying that these elements must be present for us to achieve good results. This signifies that policy implementation is a big problem that requires to be addressed by the stakeholders.

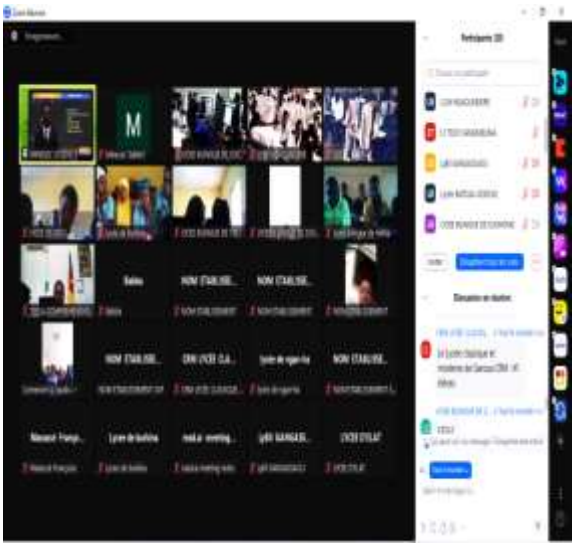
- Thirdly, on the question related to digital infrastructure and equipment, all four inspectors noted that despite efforts to equip secondary/high schools through the cyber education project and the one-student-per-laptop initiative, majority of secondary/high schools still do not have access to computers, internet, and related learning technologies. The situation is typically worsened in the South-West Region with the ongoing socio-political crisis during which computer laboratories are set ablaze, offices broken and computers taken away. We must therefore note in a general perspective that, the fact that teachers and students do not possess computers is absurd to draw a line on developing digital economy skills on them.

- Finally, concerning the question related to ICT-pedagogy skills by teachers, these inspectors noted that secondary/high school teachers have for the past years demonstrated reluctance towards using ICT in the teaching process. However, the advent of the covid-19 has made the use of technology a must in teaching. The bottom line from the responses of these inspectors depicts that secondary/high school teachers are required to double their efforts to upskill.

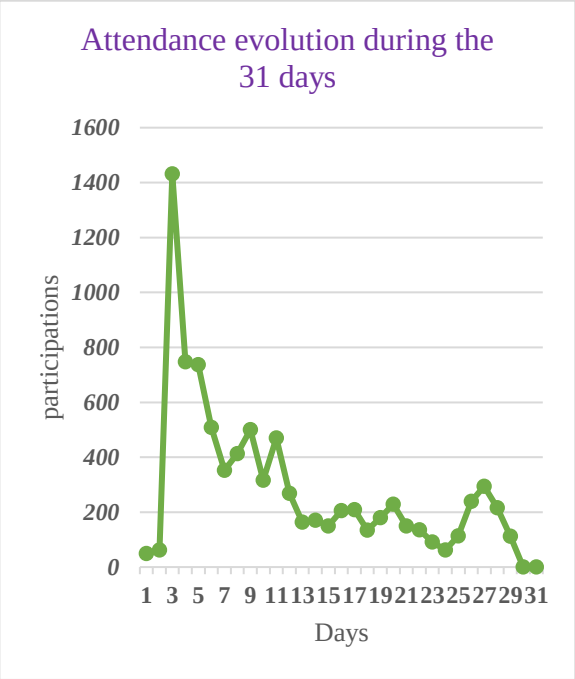
4.2. Participant observation carried out at the Distance Learning Centre of the Ministry of secondary Education, situated in Yaoundé (from April 19th to June 27th, 2022)

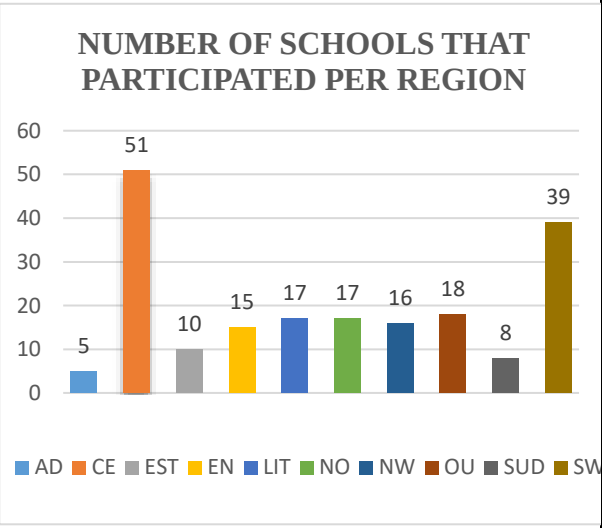
4.2.1. Presentation and analysis of participant observations

Item observed	Appreciation		Observations/description
	Sufficient	Insufficient	
Policy design/ reform/ decision creating this centre: relevance and considerations.		✓	There is neither a sectoral nor a ministerial policy for e-learning in the Ministry of Secondary Education. Also, there is no decision creating the Distance Learning Centre in the Ministry of Secondary Education for now. There is no action plan to guide the activities of the centre. However, there are

			actions that have been taken to institutionalise the centre in a short or mid-term.
Implementation plan: effectiveness/efficiency		✓	There is no harmonised implementation plan. All they do is to prepare MOOCs sent online in a bid to help the students revise the face-to-face lessons they had in class and help them revise. - **Revisions for official exams**  In order to assist secondary school students revise their upcoming official examinations, the Centre for Distance Education, in accordance with the guidelines of the Minister of Secondary Education, organised from May 19th to June 25th, 2022 live revision sessions. This learning sessions took place from 9:00 a.m. to 6:00 p.m. daily by pedagogic teams from various inspectorates in the Anglophone and Francophone subsystems. The organization was as follows: Timetables were developed and disseminated on all official communication platforms. The timetable was drawn to include subjects from

			both the General and Technical schools. Each learning session was allotted 1 hour 30 minutes. The programming for the revision classes got to students through the regional delegates, then to the heads of schools and then students throughout the 10 regions of Cameroon. A total of 457 live revision sessions were organized. We registered the participation of students from all the 10 Regions. This report provides details of learners and schools involvement. It also includes the impressions of these learners about the difficulties encountered during the revision classes. A total of 196 schools participated to these live revisions with a participation of 67 bilingual schools both public and private. 8,709 students' participations, including 4,411 Anglophone and 4,298 Francophone students, were recorded. It should be noted that these subjects mainly concerned students in examination classes.





During the live, the following difficulties were registered:

- The internet connection used is very often unreliable, regularly interrupted, slow. It follows that the quality of the communication is poor (blurry images, communication interruptions, inaudible sound…). In addition, school officials and parents complain about the high cost of internet connection;

			- The electricity supply is very often interrupted at the Center and in the schools; - In several schools, the logistics needed to access the internet are unavailable (computer, modem), to the point that some teachers work using their smartphones; Based on this, we brought out the following recommendations: - Talks should be relaunched with the Internet Service Providers to significantly reduce connection costs when learners access our course delivery platforms. This move will expect to see a significant number of students accessing the resources of the Center for Distance Education; - That support in computer equipment linked to "Distance Education" (DE) continue and that training missions in the use of DE resources be considered; - That the project to install solar systems in schools continue.
Programs: relevance of content to digital economy skills		✓	The content of programmes permits the development of few skills for the digital economy (only 3 out of 14); which is just marginal. For a full development of the said skills, the teaching programmes must be revamped completely.
Equipment: availability of updated computers, smart screens, video recording system or equipment, online		✓	In terms of infrastructure, there is a distance learning centre which comprises, inter alia: - 5 studios - a pedagogic block - a conference room. In terms of equipment, there are:

lesson delivery systems			- 12 desktops - 5 smart screens - a video recording system - 200 modems for internet connection. - 10 HP PROBOOK laptops, 8Go RAM each - 02 high quality TV cameras, SONY MC2500 with an SD card of 128 Go; - 03 video Projectors, ACER; - 2 white boards with erasers; - 02 external USB hard drives of 4 terra each.
E-learning software: MOOCs, Moodle, etc.		✓	The functional software becomes heavy due to the increase of the demand. At first, it was used only for teaching-learning transactions. Now, there is a second action required for evaluation. In terms of results: - More than 7,000 MOOCs have been developed in various fields (Arts, Science, Vocational Training, etc); - Teachers' capacities have been developed and built through seminars and workshops; etc.

4.2.2. Summary of Observations

From the above table, the results of the observations carried out by the researcher show that a significant action has been taken by the Ministry of Secondary Education to open a Distance Learning Centre for secondary schools across the country. This is a milestone towards the digitalization of learning in secondary education and the development of skills of the digital economy in Cameroon. These results reveal that there is no strategic plan for this project to meet the expectations. It should be noted that there exists only one distance learning centre for close to two million students across the national territory. More to be desired is the fact that students who reside at semi-urban, rural and remote areas are yet to have the resources to connect to this centre. The hundred-billion-dollar question is, to what extent can only one distance learning centre meet

the learning needs of hundreds of thousands of students across the country? This is tied to a large insufficiency of resources to multiplying these across the country and the problem of energy supply. This is a significant segregation between urban and remote students, poor and rich students, abled and disabled; hence, raising a finger at ICT-inclusive learning policies at the Ministry of Secondary Education.

Related important information obtained from the observation is the significant gap in ICT-pedagogy by teachers. As an action which seems abrupt, very few teachers have been upskilled to brace up with ICT-related pedagogy in secondary schools. Also, the programme content delivered to these students has very little to do with digital job market demands. This has been the core to the problem of preparing students for today's job market. However, statistics demonstrate a significant need for an overhaul to this curriculum.

4.3. Presentation of Tables of Frequency and Percentages

This section presents data from 865 Levels 100 and 200 university students who responded to questionnaires on tables of frequency and percentages as seen below**.**

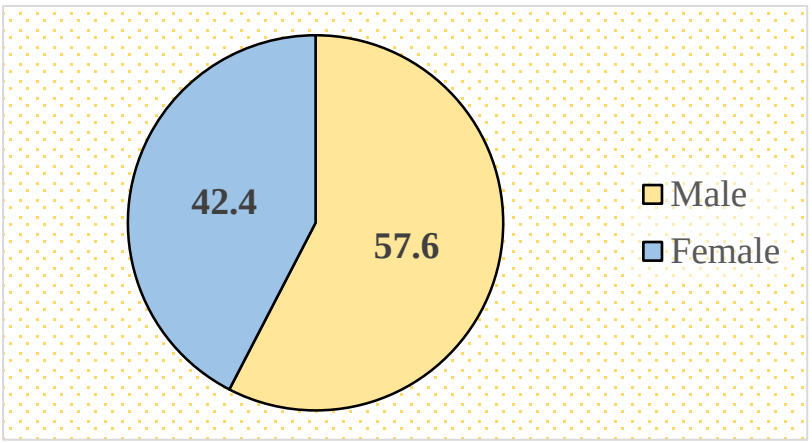
Table 22: SHOWING DEMOGRAPHIC INFORMATION OF RESPONDENTS (Field statistics)

N°	Items	Modalities	Frequency	Percentage (%)
1	Gender	Male	498	57.6
		Female	367	42.4
2	Age range	17-20	2	0.2
		21-23	95	11.0
		24-27	118	13.6
		28-30	292	33.8
		30 plus	358	41.4
3	Academic level	Level I	622	71.9
		level II	243	28.1
4	Series	History	113	13.1
		Sociology	149	17.2
		Anthropology	41	4.7
		Geography	106	12.3

		Psychology	96	11.1
		English language and literature	118	13.6
		French Language	83	9.6
		Bilingual Letters	94	10.9
		Foreign Languages	65	7.5
5	Reason for enrolling into university	Could not pick a job after my Bachelors of Degree	679	78.5
		I am following a particular career path	108	12.5
		My friends motivated me to	65	7.5
		I continue learning for my professional exigencies	13	1.5
6	Unemployment duration since graduate	1-2 years	335	38.7
		3-4 years	329	38.0
		5-6 years	64	7.4
		7-8 years	83	9.6
		8 years and above	54	6.2

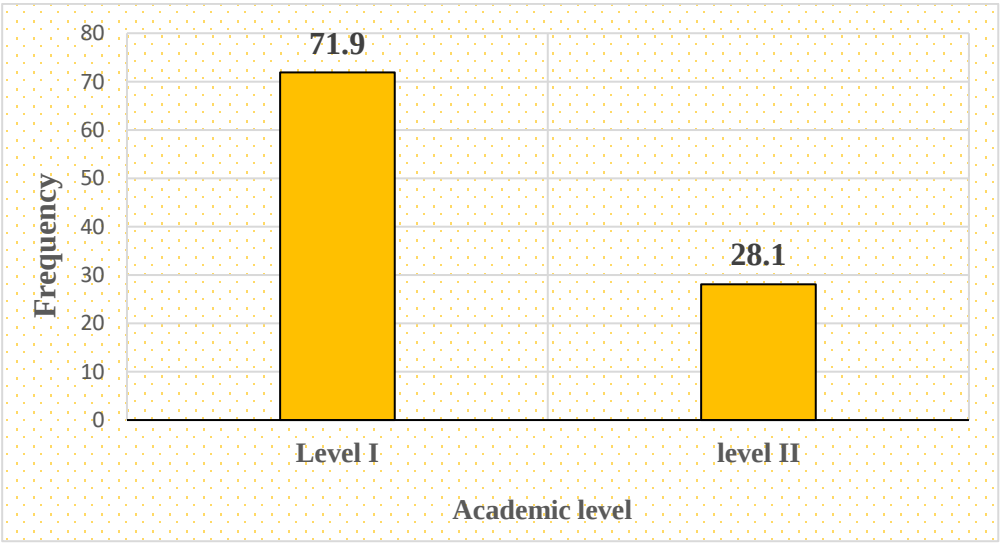
- **Item 1** presents that out of the 865 undergraduate students at the faculties of Arts, letters and social sciences of the four state universities sampled for this study, 498, making 57.6% are male; whereas 367 making 42.4% are female. This means that a bulk of those who continue into the masters' level are male, hence, are those who inflate the unemployment figures as well. This can be more tangible in the graph below:

Graph 15: Distribution of respondents by gender (Source: Field statistics)



- **Item 2** shows that only 2 students, representing a relative value of 0.2% % fall between 17-20 age group, 95 students, making a percentage of 11.0% age between 21-23, 118 students, representing a proportion of 13.6% are from the 24-27 age group, 292 making 33.8% fall within 28-30 years group, while 358 students representing a proportion of 41.4% are from 30 years and above. When we look at these statistics, we see that the majority of students are above 25, which is considered ripe for the job market according to the regulation in force.
- **Item 3** portrays that 622, representing a proportion of 71.9% are level 100 students, whereas 243 making 28.1% are in level 200. This indicates the majority of students sampled are freshers from the secondary school cycle. The following graph makes it more explicit:

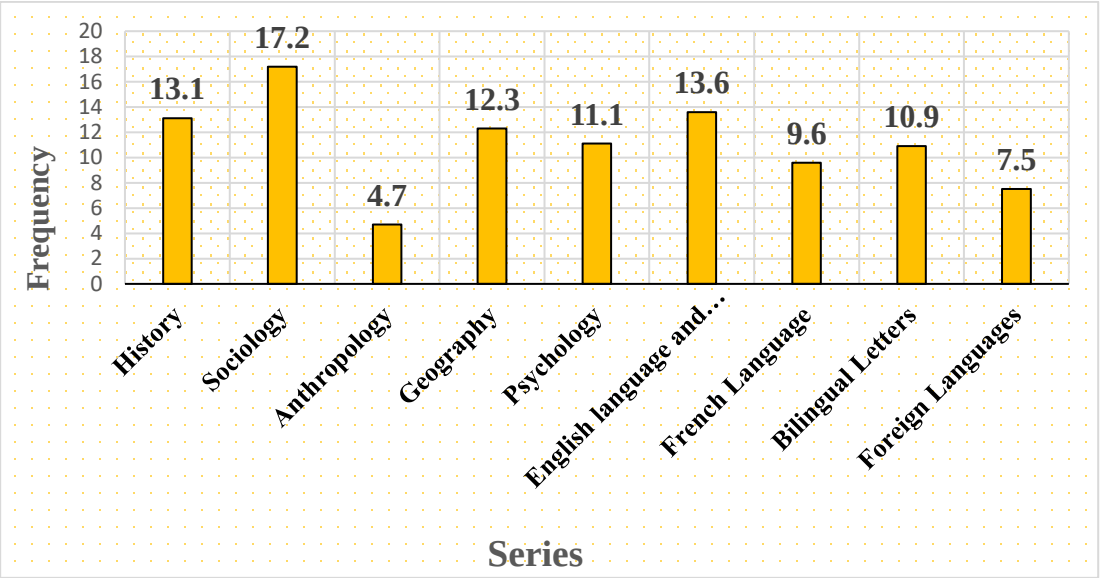
Graph 16: Distribution of respondents by level of studies (Source: Field statistics)



- **Item 4** presents statistics on the series of students, indicating that 113 students representing 13.1% are from history, 149 students making 17.2% are from sociology, 41 students representing

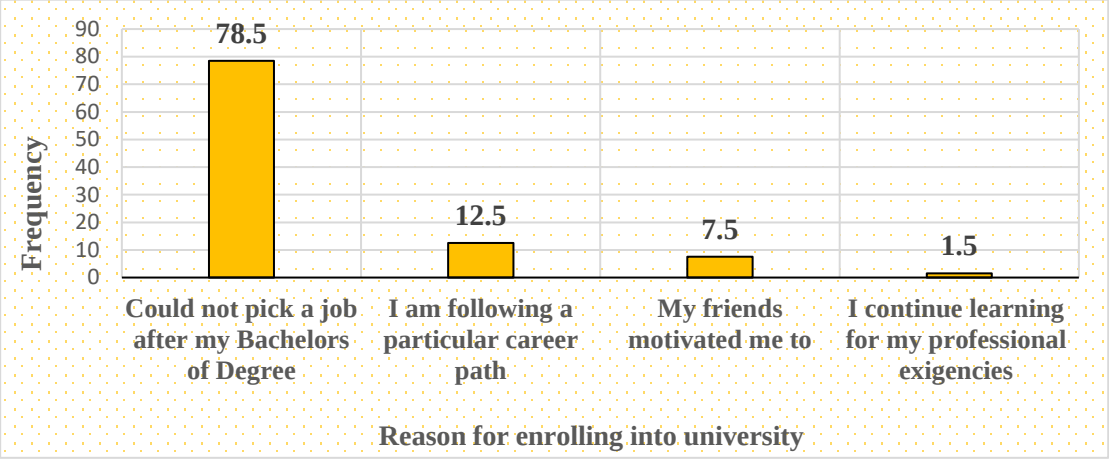
a proportion of 4.7%, are from anthropology, 106 students, making 12.3%, 96 students representing 11.1% are offering psychology, 118 students represent a proportion of 13.6% are offering English language and literature, 83 students making 9.6% are offering French language and literature, 94, representing a proportion of 10.9% are bilingual letters, while 64, making 7,5 % are offering foreign languages. The observation we make here is that the students answered questionnaires based on their availability. This distribution is x-rayed by the following graph:

Graph 17: Distribution of respondents according to their series (Source: Field statistics)



- **Item 5** presents statistics on what motivated the students to continue into the bachelor's degree after high school. In this light, 679 representing a proportion of 78.5% of the sample declared that it was because they could not pick a job after graduating from the high school, 108, making 12.5% indicated that they are following a career path, 65 representing a relative value of 7.5% said they were following their friends, while only 13, making 1.5% confirmed that they enrolled in bachelor's because of continuous learning based on their professional exigencies. Looking at these statistics, we have observed that a bulk of the students at the bachelor's cycle are there because they could not pick up a job or create one upon graduation at the high school level. This graph makes it more explicit:

Graph 18: Distribution of respondents according to their reason for enrolling into university (Source: Field statistics)



- **Item 6** shows the period of time spent by these graduates without employment. As a matter of fact, 335 of them, representing 38.7% indicated that they have spent between 1-2 years without a job since they graduated from high school, 329 making 38.0% said they have been without a job for 3 or 4 years, 64 making 7.4% pointed out that they have been out from 5 to 6 years without having a job, 86 representing 9.6% have been jobless for 7 or 8 years, while 54 representing 6.2% have been jobless from 8 years and above. This is evidence that the unemployment problem is real. The graph below gives an image of the problem:

Graph 19: Distribution of respondents according to Unemployment duration since graduation (Source: Field statistics)

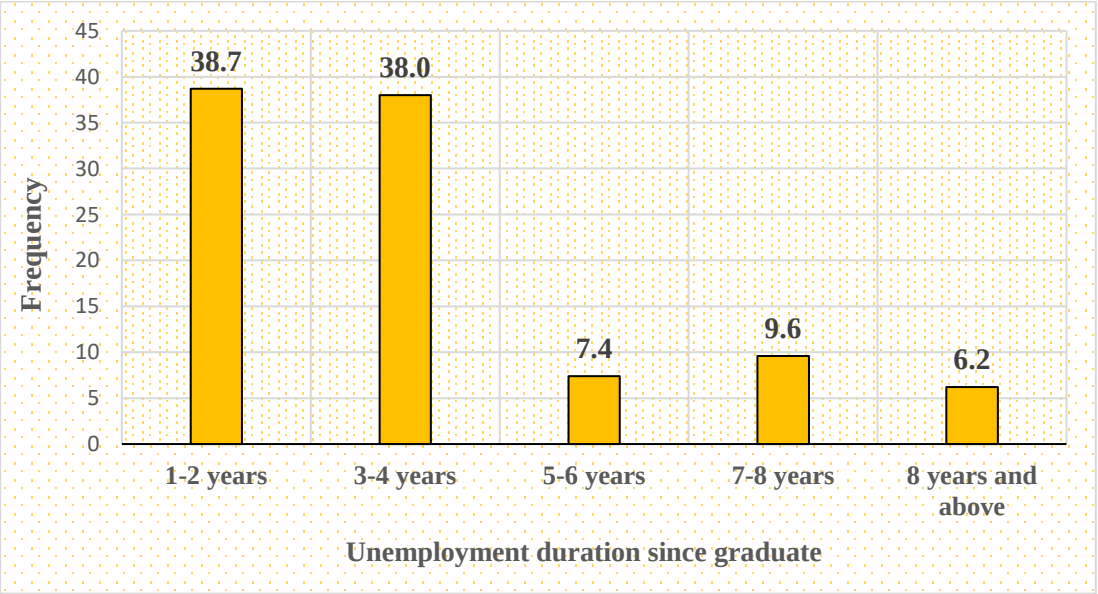


Table 23: DISTRIBUTION OF RESPONSES ACCORDING TO E-LEARNING POLICY DESIGN (Field statistics)

Item	Statement		SDA	DA	UN	A	SA
01	I'm aware of the existence of a relevant policy	*f*	415	194	62	166	28
	that supports e-learning in secondary education	%	48.0	22.4	7.2	19.2	3.2
02	I am aware of the existence of a digital	*f*	317	196	120	172	60
	learning plan designed by the government to	*%*	36.6	22.7	13.9	19.9	6.9
	guide the use of technology in the classroom						
03	The policy goals are relevant to the	*f*	308	147	189	150	71
	development of skills for the digital economy	%	35.6	17.0	21.9	17.3	8.2
04	There is an existing implementation plan for e-	*f*	237	172	169	189	88
	learning at the secondary school.	*%*	28.6	19.9	19.5	21.8	10.2
05	There are elements of access, equity and	*f*	135	247	221	181	81
	inclusion in digital learning policy in	*%*	15.6	28.6	25.5	20.9	9.4
	secondary education in Cameroon.						
06	I am convinced that this policy provides for	*f*	324	177	149	140	75
	Partnership between teaching-learning and						
	the business world	*%*	37.4	20.5	17.2	16.2	8.7
07	Secondary Education policy has made	*f*	704	40	42	31	48
	provisions for Opened Education Resources						
	such as digital libraries, opened access journals	*%*	81.4	4.6	4.9	3.6	5.5
	for teachers and students and expand access to						
	textbooks and other forms of learning content.						
08	Digital policy has laid down sustainability	*f*	246	192	97	167	163
	mechanisms						
		%	28.4	22.2	11.2	19.3	18.9
09	This policy is SMART (Specific, Measurable,	*f*	437	103	176	90	59
	Achievable, Realistic and Time-bound)						
		%	50.5	11.9	20.4	10.4	6.8

- **Item 1** samples the opinion of respondents on their awareness of the existence of a relevant digital learning policy designed to guide the use of technology in government secondary schools in Cameroon. In this regard, 415, representing a proportion of 48.0% of the respondents strongly disagreed that they are aware, 194 making 22.4% said they disagree, 62 representing 7.2% stayed mute, 166 making 19.2% agreed, and 28 making 3.2 % of the respondents strongly agreed. These statistics simply signify that there is absence of an e-learning policy in secondary schools.
- **Item 2** presents the opinion of respondents on their awareness of the existence of an e-learning plan designed by the Ministry of Secondary Education to guide the use of technology in the classroom. In this regard, 317, representing a proportion of 36.6% of the respondents strongly disagreed that they are aware, 196 making 22.7% said they disagree, 120 representing 13.9% stayed mute, 172 making 19.9% agreed, and 60 representing a proportion of 6.9% of the respondents strongly agreed. These statistics demonstrate that there is no digital action in secondary schools.
- **Item 3** x-rays respondents' opinion if the existing policy goals are relevant to the development of digital economy skills. In this light, 308, representing a relative value of 35.6% of the respondents strongly disagreed, 147 making 17.0 % said they disagree, 189 making 21.9% stayed neutral, 150 representing 17.3% agreed, and 71 making 8.2 % of the respondents strongly agreed. These statistics reveal that policy ingredients are insufficiently directed to deal with developing skills for the digital economy.
- **Item 4** samples respondents' opinion if there is an existing implementation plan for e-learning in these schools. In this regard, 237, representing a proportion of 28.6% of the respondents strongly disagreed, 172 making 19.9 % said they disagree, 169 making 19.5% stayed neutral, 189 representing 21.8% agreed, and 88 making 10.2 % of the respondents strongly agreed. Looking at these statistics, we can affirm the fact that a majority of the students were against the fact that there exists an implementation plan for e-learning in these schools. However, a considerable 21.8% and 10.2% percentage agreed and strongly agreed which meant an insufficient plan existed.
- **Item 5** presents respondents' opinion if there exist elements of access, equity and inclusion in digital learning policy in secondary education in Cameroon. In this light, 135, representing a relative value of 15.6% of the respondents strongly disagreed, 247 making 28.6 % said they disagree, 221 representing 25.5% stayed neutral, 181 making 20.9 % agreed, and 84 making 9.4 % of the respondents strongly agreed. Even though a considerable number of the respondents indicated that there exist insufficient elements of access, equity and inclusion in digital learning

policy in secondary education, a good number of these respondents remained undecided, while an insignificant number agreed. This signifies that sufficient elements of access, equity and inclusion in digital learning policy in secondary education is a call for attention by stakeholders.

- **Item 6** x-rays respondents' opinion if the policy establishes a partnership between teaching-learning and the business world. In this regard, 324, representing a proportion of 37.4% of the respondents strongly disagreed, 177 making 20.5 % said they disagree, 149 representing a relative value of 17.2% stayed neutral, 140 making 16.2 % agreed, and 75 making 8.7 % of the respondents strongly agreed. From an observation of these statistics, we can conclude that relevant partnership ties are absent in existing policy statements. In that light, some comments made it known that corporate has a frontline role to play in developing digital economy skills since it best understands their human resource needs.
- **Item 7** samples respondents' opinion if secondary schools e-learning policy has made provisions for Opened Education Resources (OER) such as digital libraries, opened access journals for teachers and students and expands access to textbooks and other forms of learning contents. In this regard, 704, representing 81.4% of the respondents strongly disagreed, 40 making 4.6 % said they disagree, 42 representing a relative value of 4.9 % stayed neutral, 31 making 3.6 % agreed, and 48 representing 5.5 % of the respondents strongly agreed. Here, up to 81.4 % strongly disagreed, with an additional 4.6% who disagreed to this statement, meaning there is no OER in secondary schools in Cameroon.
- **Item 8** presents respondents' opinion if the digital policy has laid down a strategy that will lead the nation to the achievement of the Sustainable Development Goals, and Goal number 4 in particular that targets inclusive and equitable quality and lifelong learning. In this regard, 246, representing 28.4% of the respondents strongly disagreed, 192 making 22.2 % said they disagree, 97 representing a relative value of 11.2 % stayed neutral, 167 making 19.3 % agreed, and 163 representing 18.9 % of the respondents strongly agreed. Although a considerable number of respondents denied this statement, a considerable number agreed and strongly agreed to this statement. It also follows from the comments section that every education action taken after the ratification of the UN Agenda for sustainable development is geared towards its achievement.
- **Item 9** x-rays respondents' opinion on how SMART (Specific, Measurable, Achievable, Realistic and Time-bound) is the policy in Cameroon secondary education. In this vein, 437, representing a proportion of 50.5% of the respondents strongly disagreed, 103 making 11.9 % said they disagree, 176 representing a relative value of 20.4 % stayed neutral, 90 making 10.4 % agreed, and 59 representing 6.8 % of the respondents strongly agreed. Looking at the percentage against

and that which is neutral, we can conclude that the SMART model is yet to be instituted in digital learning in Cameroon secondary education.

Table 24: DISTRIBUTION OF RESPONSES ACCORDING TO PROGRAMMES/CURRICULUM DESIGN IN DIGITAL LEARNING (Field statistics).

Item	Statement		SDA	DA	UN	A	SA
01	Our course objectives targeted skills for the digital economy	*f*	480	127	95	111	52
		%	55.5	14.7	11.0	12.8	6.0
02	The course content was full of digital economy element such as medial skills, online marketing skills, digital communication, innovation and creativity, etc.	*f*	327	44	333	124	37
		%	37.8	5.1	38.5	14.3	4.3
03	The Digital economy content is being taught as the mainstream content.	*f*	423	110	187	93	52
		%	48.9	12.7	21.6	10.8	6.0
04	There exists a curriculum/course design for digital classrooms (online learning)	*f*	434	117	151	102	61
		%	50.2	13.5	17.5	11.8	7.0
05	There is partnership with the labour market sector on programme/curriculum development.	*f*	586	155	33	61	30
		%	67.7	17.9	3.8	7.1	3.5
06	There exist effective partnerships between Theory Vs Practice in content delivery.	*f*	319	97	16	395	38
		%	36.9	11.2	1.8	45.7	4.4
07	The curriculum is adapted to students with disabilities.	*f*	503	164	8	64	126
		%	58.1	19.0	0.9	7.4	14.6

- Item 1 samples respondents' opinion if course objectives target the development of skills for the digital economy. In this regard, 480, representing a proportion of 55.5% of the respondents strongly disagreed, 127 making 14.7% said they disagree, 95 representing 11.0% stayed mute, 111 making 12.8% agreed, and 52 representing a relative value of 6.0% of the respondents strongly agreed. This signifies that these high school graduates have not been prepared for the 21st century world of work.

- **Item 2** presents respondents' opinion if the course content was full of digital economy elements such as media skills, online marketing skills, digital communication skills, innovation and creativity skills. In this regard, 327, representing 37.8% of the respondents strongly disagreed, 44 making 5.1% said they disagree, 333 representing a proportion of 38.5% stayed mute, 124 making 14.3% agreed, and 37 representing a relative value of 4.3% of the respondent strongly agreed. As observed in this item, most respondents denied having been exposed to these skills during high school studies. Also, a considerable percent of 38.5 did not have anything to say about this. This is quite worrying for 21st century graduates.
- **Item 3** x-rays respondents' opinion if digital economy skills are being taught as mainstream. In this regard, 423, representing 48.9% of the respondents strongly disagreed, 110 making 12.7% said they disagree, 187 representing a relative value of 21.6% stayed mute, 93 making 10.8% agreed, and 52 representing a relative value of 6.0% of the respondents strongly agreed. As observed in this item, most respondents denied that these skills are being taught as a mainstream. Also, a considerable percentage of 21.6 did not have anything to say about this. This is quite worrying for 21st century secondary school graduates.
- **Item 4** samples respondents' opinion if there exists a curriculum/course design for digital classrooms (online learning). In this regard, 434, representing a relative value of 50.2% of the respondents strongly disagreed, 117 making 13.5% said they disagree, 171 making 17.5% stayed mute, 102 representing 11.8% agreed, and 61 making 7.0% of the respondent strongly agreed. As observed in this item, a bulk of respondents denied to have obtained adaptability skills during their first cycle studies. Also, a considerable percentage of 17.5 did not have anything to say about this. This is quite disturbing for 21st century graduates who are expected to adapt to the novelty of job market.
- **Item 5** presents respondents' opinion if there is partnership with the labour market sector on programme/curriculum development. In this regard, 586, representing 67.7% of the respondents

strongly disagreed, 155 making 17.9% said they disagree, 33 representing a relative value of 3.8% stayed mute, 61 making 7.1% agreed, and 30 representing 3.5% of the respondents strongly agreed. We have observed from these statistics that, a bulk of respondents denied having experienced engaging in internships with organizations. This can play against 21st century graduates who are expected to build projects for themselves and for their communities.

- **Item 6** x-rays respondents' opinion if there exist effective partnership between theory vs practice. In this regard, 586, representing a proportion of 36.9% of the respondents strongly disagreed, 97 making 11.2% said they disagree, 16 representing 1.8% stayed mute, 395 making 45.7 % agreed, and 38 representing a relative value of 4.4% of the respondents strongly agreed. We have observed from these statistics that, the majority of respondents confirmed to have been exposed to practice during their high school. However, the fact that a reasonable number is also denied is quite disturbing for 21st century graduates who are expected to have vocational skills to easily transit to the job market.
- **Item 7** samples respondents' opinion if the curriculum is adapted to students with disabilities. In this regard, 503, representing a proportion of 58.1% of the respondents strongly disagreed, 164 making 19.0% said they disagree, 8 representing 0.9% stayed mute, 64 making 7.4% agreed, and 126 representing a relative value of 14.6% of the respondents strongly agreed. We can observe from these statistics that a bulk of respondents denied that the curriculum is inclusive.

Table 25: DISTRIBUTION OF RESPONSES ACCORDING TO GOVERNANCE/POLICY IMPLEMEMTATION (Field statistics)

Item	Statement		SDA	DA	UN	A	SA
01	There exists an implementation plan.	*f*	510	174	111	48	22
		%	59.0	20.1	12.8	5.6	2.5
02	Decision-making has been well done with regards to e-learning issues.	*f*	403	128	143	147	44
		%	46.6	14.8	16.5	17.0	5.1
03	There is an e-governance in our schools.	*f*	232	123	256	161	93
		%	26.8	14.2	29.6	18.7	10.7

04	I'm aware there is transparency and accountability in governance issues in this context	*f*	36	23	0	744	62
		%	4.2	2.6	0	86	7.2
05	There is sustainability in finance and maintenance of digital equipment.	*f*	324	177	149	140	75
		%	37.5	20.5	17.2	16.2	8.6
06	There is sufficient resource mobilisation capacity by our leaders.	*f*	537	64	135	101	28
		%	62.1	7.4	15.6	11.7	3.2
07	I observed an effective monitoring and evaluation mechanisms by the managers in digital learning policy implementation	*f*	286	124	182	168	105
		%	33.1	14.3	21.0	19.4	12.2

- **Item 1** presents respondents' opinion if there exists an implementation plan for digital learning in secondary schools. In this regard, 510, representing a relative value of 59.0% of the respondents strongly disagreed, 174 making 20.1% said they disagree, 111 representing 12.8% stayed mute, 48 making 5.6% agreed, and 22 representing a proportion of 2.5% of the respondents strongly agreed. Looking at these statistics, there is no implementation plan for digital learning in these schools.
- **Item 2** samples respondents' opinion if decision-making has been well done with regards to e-learning issues. In this regard, 403, representing 46.6% of the respondents strongly disagreed, 128 making 14.8 % said they disagree, 143 representing a relative value of 16.5 % stayed neutral, 147 making 17.0 % agreed, and 44 representing 5.1 % of the respondents strongly agreed. These statistics indicate that decision-making has not been well-tailored towards the development of 21st century skills in secondary education in Cameroon.
- **Item 3** x-rays respondents' opinion if there existed e-governance in their schools. In this regard, 232, representing a relative value of 26.8% of the respondents strongly disagreed, 128 making 14.2 % said they disagree, 256 representing 29.6 % stayed neutral, 161 making 18.7 %

agreed, and 93 representing a proportion of 10.7 % of the respondents strongly agreed. This signifies that e-governance is still lagging in the management processes in these schools.

- **Item 4** samples respondents' opinion if they there was transparency and accountability in governance issues in this context. In this regard, 36, representing 4.2% of the respondents strongly disagreed, 23 making 2.6 % said they disagree, 744 representing a relative value of 86.0 % agreed, and 62 making 7.2 % of the respondents strongly agreed. These statistics show that administrators are using technology in task execution. This is confirmed by more than 80% who agreed to this claim. However, what followed from the comments section leaves much to be desired as most of the respondents questioned the extent to which these administrators are accountable to expenditures related to technology. For instance, a respondent declared that "the fact that most administrators fail to enforce the provision of resources for an enabling technology environment, their management of this aspect is blurred.
- **Item 5** presents respondents' opinion if there is sustainability in finance and maintenance of digital equipment. In this regard, 324, representing a proportion of 37.5% of the respondents strongly disagreed, 177 making 20.5 % said they disagree, 149 making 17.2 % stayed neutral, 140 representing 16.2 % agreed, and 75 making 8.6 % of the respondents strongly agreed. These results indicate that there is much need for sustained financing in e-learning issues in secondary education.
- **Item 6** x-rays respondents' opinion if there is sufficient resource mobilisation capacity by our leaders. In this regard, 537, representing a relative value of 62.1% of the respondents strongly disagreed, 64 making 7.4 % said they disagree, 135 representing 15.6 % stayed neutral, 101 making 11.7% agreed, and 28 representing a relative value of 3.2 % of the respondents strongly agreed. This implies there is urgent need for resources mobilization, which is confirmed as a precondition in digital learning in secondary schools in Cameroon. This is evidence as up to 62.1% and 7.4% strongly disagreed and agreed respectively.
- **Item 7** presents respondents' opinion if there were practical monitoring and evaluation mechanisms . In this regard, 286, representing 33.1% of the respondents strongly disagreed, 124 making 14.3 % said they disagree, 182 representing a relative value of 21.0 % stayed neutral, 168 representing 19.4% agreed, and 105 making 12.2 % of the respondents strongly agreed. Looking at these statistics, we observe that a majority making 33.1% plus 14.3% are all against this point. Meaning that managers do not effectively monitor digital learning. Also, a reasonable percentage of 19.4 were neutral, meaning that practical evidence for monitoring is absent. However, the small percentage that agreed made us to understand that administrators consider feedbacks and reports by various departmental chairs as good enough.

Table 26: DISTRIBUTION OF RESPONSES ACCORDING TO E-LEARNING INFRASTRUCTURES AND EQUIPMENT (SOURCE: FIELD STATISTICS)

Item	Statement		SDA	DA	UN	A	SA
1	There were ICT tools such as computers that facilitated learning.	*f*	547	/	/	/	318
		%	63.2	/	/	/	36.8
2	There exist 21st century teaching halls (smart classroom environment)	*f*	406	97	150	151	61
		%	46.9	11.2	17.3	17.5	7.1
3	There exist updated software devices for the 21st century teaching-learning.	*f*	213	167	137	282	66
		%	24.6	19.3	15.8	32.6	7.6
4	There exists a high-speed internet connectivity for e-learning.	*f*	135	152	175	366	37
		%	15.6	17.6	20.2	42.3	4.3
5	There exist ICT tools adapted to people with disabilities.	*f*	714	131	20	/	/
		%	82.6	15.1	2.3	/	/
6	key stakeholders possess technological devices in the teaching environment	*f*	475	68	231	91	/
		%	54.9	7.9	26.7	10.5	/
7	There exists a mechanism for permanent maintenance of digital infrastructure and equipment which is effectively put in place.	*f*	409	57	287	100	12
		%	47.2	6.6	33.2	11.6	1.4

- **Item 1** samples respondents' opinion if there were ICT tools like computers that facilitated learning. They were equally asked to indicate in the commentary section whether they afforded their personal computer. In this regard, 547, representing a relative value of 63.2% of the respondents strongly disagreed while 318 making 36.8% said they disagree. As observed in this item, majority of respondents do not own a computer. This makes it difficult for digital learning to take place successfully.
- **Item 2** presents respondents' opinion if there were 21st century teaching halls (smart classroom environment) on campus, and that students should indicate the functionality and the

frequency they visited these halls. In this regard, 406, representing 46.9% of the respondents strongly disagreed, 97 making 11.2% said they disagree, 150 representing a proportion of 17.3% stayed mute, 151making 17.5% agreed, and 61representing 7.1% of the respondents strongly agreed. As observed in this item, majority of respondents denied the existence of a well-equipped multimedia centre on campuses. These students posited that the existence of these smart classrooms can be seen as a solution only when they are functional and responding to the needs of the digital transformation in secondary education in Cameroon.

- **Item 3** x-rays respondents' opinion if there were updated software devices for the 21st century teaching-learning. Indicate other ones that you have used in the comment. In this regard, 213, representing a relative value of 24.6% of the respondents strongly disagreed, 167 making 19.3% said they disagree, 137 representing 15.8% stayed mute, 282 making 32.6% agreed, and 66 representing a proportion of 7.6% of the respondents strongly agreed. Judging from the above data we can conclude that these LMS are available to a certain degree, but the problem is their usage. In this light, comments by these respondents indicated that very few teachers use them.
- **Item 4** samples respondents' opinion if there was a high-speed internet connectivity for e-learning. In this regard, 135, representing a relative value of 15.6% of the respondents strongly disagreed, 152 making 17.6% said they disagree, 175 representing 20.2% stayed mute, 366 making 42.3% agreed, and 37 representing a proportion of 4.3% of the respondents strongly agreed. These data show that the extent to which campuses are connected to permanent and high-speed internet is not the best amid not being below average.
- **Item 5** presents respondents' opinion if there were ICT tools adapted to people with disabilities. In this regard, 714, representing a relative value of 82.6% of the respondents strongly disagreed, 131 making 15.1% said they disagree, while 20 representing 2.3% stayed mute. This signifies that people with disabilities do not benefit from e-learning as they are supposed to. The online teaching and evaluation systems are not adapted to their various impairments which can make the few ones in schools to drop out.
- **Item 6** x-rays respondents' opinion if key stakeholders possessed technological devices in the teaching environment. In this regard, 475, representing 54.9% of the respondents strongly disagreed, 68 making 7.9% said they disagree, 231 representing a relative value of 26.7% stayed mute, while 91 making 10.5% agreed. These statistics are also clear on the fact that key stakeholders do not possess technological devices in the teaching environment for preparing students for the digital economy.

- **Item 7** samples respondents' opinion if a mechanism for permanent maintenance of digital infrastructure and equipment is effectively put in place. In this regard, 409, representing a relative value of 47.2% of the respondents strongly disagreed, 57 making 6.6% said they disagree, 287 making 33.2% stayed mute, 100 representing a proportion of 11.6% agreed, and 12 making 1.4% of the respondents strongly agreed. These statistics also indicate that there is more to be desired as concerns the maintenance of the existing infrastructure and equipment.

Table 27: DISTRIBUTION OF RESPONSES ACCORDING TO E-LEARNING TEACHING METHODS (SOURCE: FIELD STATISTICS)

Item	Statement		SDA	DA	UN	A	SA
1	Our secondary school teachers used the Competence-Based Approach to teach us.	*f*	450	77	94	169	74
		%	52.0	8.9	10.9	19.6	8.6
2	Our secondary school teachers used project-based learning during our lessons.	*f*	714	151	/	/	/
		%	82.5	17.5	/	/	/
3	Our secondary school teachers used the problem-based-learning in teaching us	*f*	671	30	3	99	62
		%	77.6	3.5	0.3	11.4	7.2
4	Our teachers used the inquiry-based approach	*f*	552	110	71	58	74
		%	63.8	12.7	8.2	6.7	8.6
5	Our secondary school teachers used Blended learning method during our lessons	*f*	621	81	42	75	46
		%	71.8	9.4	4.8	8.7	5.3
6	Our secondary school teachers used the pure online method while teaching us.	*f*	633	80	3	99	50
		%	73.2	9.3	0.3	11.4	5.8
7	Our secondary school teachers demonstrated the required ICT-teaching skills.	*f*	507	130	89	121	18
		%	58.6	15.0	10.3	14.0	2.1

- **Item 1** samples respondents' opinion if their secondary school teachers used the Competence-Based Approach (CBA) in delivering their lessons. This approach stipulates that we

must acquire lower skills before going for higher ones. Skills are classified from simple to complex, and they reflect the resolution of real-world problems. In this regard, 450, representing a proportion of 52.0% of the respondents strongly disagreed, 77 making 8.9% said they disagree, 94 representing 10.9% stayed mute, 169 making 19.6% agreed, and 74 representing a relative value of 8.6% of the respondents strongly agreed. As observed in this item, the majority of respondents denied having effectively followed lessons with the CBA. Also, a considerable percent of 19.5% and 8.6% agreed and strongly agreed respectively. This means that some teachers used the blended mode to deliver their courses sometimes.

- **Item 2** presents respondents' opinion if they also used Project-Based Approach (PBA) in these high schools. In this regard, 714, representing a proportion 82.5% of the respondents strongly disagreed, whereas 151 making 17.5% said they disagree. As observed in this item, majority of respondents denied to have effectively followed lessons with the PBA during their first cycle studies. This means that teachers do not use the PBA to deliver their courses.
- **Item 3** x-rays respondents' opinion if their secondary school teachers used the Problem-Based Approach, 671, representing a proportion 77.6% of the respondents strongly disagreed, 30 making 3.5% said they disagree, 3 making 0.3% stayed mute, 99 representing 11.4% agreed, and 62 making 7.2% of the respondents strongly agreed. As observed in this item, most respondents denied having followed lessons with the Problem-based-learning approach during their first cycle studies. However, some accepted that they used Moodle during the covid-19.
- **Item 4** samples respondents' opinion if teachers used the Inquiry-Based Approach (IBA). In this regard, 552, making 63.8% of the respondents strongly disagreed, 110 representing a proportion 12.7% said they disagree, 71 making 8.2% stayed mute, 58 representing a proportion of 6.7% agreed, and 74 making 8.6% of the respondents strongly agreed. As observed in this item, majority of respondents denied having followed lessons with the IBA during their first cycle studies. For the most, we observed through students' responses that teachers of the cities delivered lessons through ICT mediums, implying that they demonstrate some ICT skills.
- **Item 5** presents respondents' opinion if teachers also used the blended learning method (both online and in blended modes) at high schools. In this regard, 621, representing a proportion of 71.8% of the respondents strongly disagreed, 81 making 9.4% said they disagree, 42 representing 4.8% stayed mute, 75 making 8.7% agreed, and 46 representing a proportion of 5.3% of the respondent strongly agreed. As observed in this item, majority of respondents denied to have followed lessons with the blended approach during their first cycle studies. However, some comments indicated that the frequent group works given are done in project form. For the most

part, we observed that students from the cities constitute those who agree and strongly disagree to have received lessons through these mediums.

- **Item 6** x-rays respondents' opinion if their teachers used the Pure Online Approach (POA) method. In this regard, 633, representing a relative value of 73.2% of the respondents strongly disagreed, 80 making 9.3% said they disagree, 3 representing 0.3% stayed mute, 99 making 11.4% agreed, and 50 representing a proportion of 5.8% of the respondents strongly agreed. As observed in this item, the majority of respondents denied that their teachers used pure online approach to deliver lessons during their high school studies. However, some comments indicated that students from the urban areas have frequently received lessons through technology aided means.
- **Item 7** samples respondents' opinion if the teachers demonstrated the required ICT-teaching skills. In this regard, 507, representing a relative value of 58.6% of the respondents strongly disagreed, 130 making 15.0% said they disagree, 89 representing 10.3% stayed mute, 121 making 14.0% agreed, and 18 representing 2.1% of the respondents strongly agreed. As observed in this item, the majority of respondents have not declared that almost all their teachers did not possess the required ICT skills.

Table 28: DISTRIBUTION OF RESPONSES ACCORDING TO SKILLS FOR THE DIGITAL ECONOMY (SOURCE: FIELD STATISTICS)

Item	Statement		SDA	DA	UN	A	SA
1	I am convinced high school students graduate with critical thinking and problem-solving skills that are required for today's complex world of work	*f*	674	122	52	17	/
		%	77.9	14.1	6.0	2.0	/
2	I am convinced secondary school students graduate with communication skills	*f*	663	140	39	23	/
		%	76.6	16.2	4.5	2.7	/
3	I am convinced secondary school students graduate with collaboration skills	*f*	576	214	44	31	/
		%	66.6	24.7	5.1	3.6	/
4	I am convinced secondary school students graduate with creativity skills.	*f*	704	92	33	33	3
		%	81.4	10.7	3.8	3.8	0.3
5	I am convinced secondary school students graduate with analytical skills.	*f*	128	447	143	147	/
		%	14.8	51.7	16.5	17.0	/

6	I am convinced secondary school students graduate with computer programming skills.	*f*	605	191	52	17	/
		%	69.9	22.1	6.0	2.0	/
7	I am convinced secondary school students graduate with software development skills.	*f*	675	122	57	11	/
		%	78.0	14.1	6.6	1.3	/
8	I am convinced secondary school students graduate with digital security and privacy skills.	*f*	600	180	83	2	/
		%	69.4	20.8	9.6	0.2	/
9	I am convinced secondary school students graduate with data management skills	*f*	541	118	182	24	/
		%	62.5	13.7	21.0	2.8	/
10	I am convinced secondary school students graduate with data analysis skills.	*f*	403	128	143	147	44
		%	46.6	14.8	16.5	17.0	5.1
11	I am convinced secondary school students graduate with data communication skills.	*f*	714	131	20	/	/
		%	82.5	15.2	2.3	/	/
12	I am convinced secondary school students graduate with digital design skills.	*f*	621	81	42	75	46
		%	71.8	9.4	4.8	8.7	5.3
13	I am convinced secondary school students graduate with project management skills	*f*	232	123	256	161	93
		%	26.8	14.2	29.6	18.6	10.8
14	I am convinced secondary school students graduate with business processing skills	*f*	237	172	169	189	88
		%	28.6	19.9	19.5	21.8	10.2

- **Item 1** presents respondents' opinion if secondary school students graduate with critical thinking and problem-solving skills that are required for today's complex world of work. In this regard, 674, representing a relative value of 77.9% of the respondents strongly disagreed while 122 making 14.1% said they disagree, 52 representing 6.0% stayed mute, while 17 making 2.0%

agreed. This signifies that students are not equipped with the critical thinking and problem-solving skills during their studies.

- **Item 2** samples respondents' opinion if high school students graduate with communication skills designed for penetrating the 21st century work environment. In this regard, 663, representing a relative value of 76.6% of the respondents strongly disagreed while 140 making 16.2% said they disagree, 39 representing a relative value of 4.5% stayed mute, while 23 making 2.7% agreed. This signifies that students are not equipped with the communication skill during their high school studies.
- **Item 3** x-rays respondents' opinion if high school students graduate with collaboration skills which are the skills required in today's workplace. In this regard, 576, representing a relative value 66.6% of the respondents strongly disagreed while 214 making 24.7% said they disagree, 44 making 5.1% stayed mute, while 31 representing 3.6% agreed. This signifies that students are not equipped with 21st c skills of collaboration, teamwork and leadership during their high school studies.
- **Item 4** samples respondents' opinion if high school students graduate with creativity skills. In this regard, 704, representing 81.4% of the respondents strongly disagreed while 92 making 10.7% said they disagree, 33 representing a relative value of 3.8% stayed mute, 33 making 3.8% agreed while 3 representing 0.3 % strongly agreed. This signifies that students are not equipped with the creativity skill during their studies.
- **Item 5** presents respondents' opinion if high school students graduate with analytical skills. In this regard, 128, representing a relative value of 14.8% of the respondents strongly disagreed while 447 making 51.7 % said they disagree, 143 making 16.5% stayed mute, while 147 making 17% agreed. This signifies that students are not equipped with analytical skills during their studies;
- **Item 6** samples respondents' opinion if high school students graduate with computer programming skills that enhance their integration in every job that demand these skills. In this regard, 605, representing a proportion of 69.9% of the respondents strongly disagreed while 191 making 22.1% said they disagree, 52 representing 6.0% stayed mute, while 17 making 2.0% agreed. This signifies that students are not equipped with computer programming skills in secondary schools.
- **Item 7** presents respondents' opinion if high school students graduate with software development skills which can help them navigate and suit to what the job market offers at a given time. In this regard, 675, representing a proportion of 78.0% of the respondents strongly disagreed while 122 making 14.1 % said they disagree, 57 making 6.6% stayed mute, while 11 making 1.3%

agreed. This signifies that students are not equipped with software development skills during their studies.

- **Item 8** x-rays respondents' opinion if first cycle students graduate with digital security and privacy skills. In this regard, 600, representing 69.4% of the respondents strongly disagreed, 180 making 20.8 % said they disagree, 83 making 9.6% stayed mute, while 2 making 0.2 % agreed. This signifies that students are not equipped with digital security and privacy skills during their studies.
- **Item 9** samples respondents' opinion if high school students graduate with data management skills. In this regard, 541, representing a relative value of 62.5% of the respondents strongly disagreed while 118 making 13.7% said they disagree, 182 representing 21.0% stayed mute, while 24 making 2.8% agreed. This signifies that students are not equipped with data communication skills during high school studies.
- **Item 10** presents respondents' opinion if high school students graduate with data analysis skills. In this regard, 403, representing a relative value of 46.6% of the respondents strongly disagreed while 128 making 14.8 % said they disagree, 143 representing 16.5% stayed mute, while 147, representing a proportion of 17% of respondents agreed and 44 making 5.1% strongly agreed. This implies that students are not equipped with data analysis skills during their studies.
- **Item 11** x-rays respondents' opinion if high school students graduate with data communication skills. In this regard, 714 representing a proportion of 82.5% of the respondents strongly disagreed while 131 making 15.2 % said they disagree, 20 representing 2.3% stayed mute, while no respondents agreed and strongly agreed respectively. This signifies that students are not equipped with data management skills during their studies.
- **Item 12** samples respondents' opinion if high school students graduate with digital design skills. In this regard, 621, representing a relative proportion of 71.8% of the respondents strongly disagreed while 81 making 9.4 % said they disagree, 42 representing 4.8% stayed mute, 75 representing a relative value of 8.7% agreed, while 46 making 5.3% strongly agreed. This signifies that students are not equipped with digital design skills during their studies.
- **Item 13** presents respondents' opinion if high school students graduate with project management skills. In this regard, 232 representing a proportion 26.8 % of the respondents strongly disagreed while 123 making 14.2 % said they disagree, 256 representing 29.6% stayed mute, 161 making 18.6% agreed, while 93 representing a relative value of 10.8 % strongly agreed. This signifies that students are not equipped with digital design skills during their studies.

- **Item 14** x-rays respondents' opinion if high school students graduate with business processing skills. In this regard, 237, 28.6 % of the respondents strongly disagreed while 172 making 19.9 % said they disagree, 169 making 19.5% stayed mute, 189making 21.8% agreed, while 88 making 10.2 % strongly agreed. This clearly indicates that students are not equipped with business processing skills during their studies.

4.4. Verification of Research Hypotheses.

The hypotheses of this study will be verified through inferential statistics in which the Pearson correlation and the multiple regression shall be used. The Pearson product-moment correlation will be used to test each research hypothesis

4.4.1. Verification of Research Hypothesis One.

RH1: There is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.

H0: There exists no/weak correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.

Ha: There exists a strong correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon

Table 29: CORRELATION BETWEEN POLICY DESIGN AND THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY AMONGST SECONDARY SCHOOL STUDENTS IN CAMEROON (Source: statistical analysis)

		Policy design	Development of skills for the digital economy
Policy design	Pearson Correlation	1	.881**
	Sig. (2-tailed)		.000
	N	865	865
Development of skills for the digital economy	Pearson Correlation	.881**	1
	Sig. (2-tailed)	.000	
	N	865	865

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between the policy design and the development of skills for the digital economy amongst secondary school students in Cameroon was investigated with the use of the Pearson product-moment correlations. From the above table, linear correlations between policy

design and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant (***P***= 0.000 ≤ *0.00005*). The Pearson's correlation coefficient ***r*** = 0.881 indicates that the policy design and the development of skills for the digital economy is strongly correlated, (***r*** = 0.881, ***P***= 0.000 ≤ *0.00005*). This confirms the alternative hypothesis, while the null is rejected, hence confirming the first research hypothesis. This signifies that the problem of developing skills for the digital economy amongst secondary school students in Cameroon is statistically blamed on nature of the e-learning policy design in secondary.

4.4.2. Verification of Research hypothesis two

RH2: There is a significant correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon.

H0: There is no correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon.

Ha: There is a strong correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon.

Table 30: CORRELATIONS BETWEEN programmes and curricula AND THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY AMONGST SECONDARY SCHOOL STUDENTS IN CAMEROON (Source: statistical analysis)

		programmes and curricula	Development of skills for the digital economy
programmes and curricula	Pearson Correlation	1	.894**
	Sig. (2-tailed)		.000
	N	865	865
Development of skills for the digital economy	Pearson Correlation	.894**	1
	Sig. (2-tailed)	.000	
	N	865	865

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon was investigated with the use of the Pearson product-moment correlations. From the above table, linear correlations between

programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant (***P***= 0.000 ≤ *0.00005*). The Pearson's correlation coefficient ***r*** = 0.894 indicates that programmes and curricula and the development of skills for the digital economy is strongly correlated, (***r*** = 0.894, ***P***= 0.000 ≤ *0.00005*). This confirms the alternative hypothesis, while the null has been rejected, hence confirming the second research hypothesis. This means that the problem of developing skills for the digital economy amongst secondary school students is statistically blamed on programme/curriculum irrelevance.

4.4.3. Verification of Research hypotheses three

RH3: There is a significant correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon
H0: There is no correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon .
Ha: There is a strong correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon

Table 31: correlations between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon (Source: statistical analysis)

		Governance/Policy implementation	Development of skills for the digital economy
Governance/Policy implementation	Pearson Correlation	1	.919**
	Sig. (2-tailed)		.000
	N	865	865
Development of skills for the digital economy	Pearson Correlation	.919**	1
	Sig. (2-tailed)	.000	
	N	865	865

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon was investigated with the use of the Pearson product-moment correlations. From the above table, linear correlations

between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant (***P***= 0.000 ≤ *0.00005*). The Pearson's correlation coefficient ***r*** = 0.919 indicates that governance/Policy implementation and the development of skills for the digital economy is strongly correlated, (***r*** = 0.919, ***P***= 0.000 ≤ *0.00005*). This confirms the alternative hypothesis, while the null has been rejected, hence confirming the third research hypothesis. This signify that the problem of developing of skills for the digital economy amongst secondary school students in Cameroon is statistically blamed on poor governance/Policy implementation.

4.4.4. Verification of Research hypothesis four

RH4: There is a significant correlation between ICT infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

H0: There is no correlation between ICT infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

Ha: There is a strong correlation between ICT infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

Table 32: CORRELATIONS BETWEEN ICT infrastructure and equipment AND THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY AMONGST SECONDARY SCHOOL STUDENTS IN CAMEROON (Source: statistical analysis)

	ICT Infrastructure/ equipment		Development of skills for the digital economy
ICT infrastructure and equipment	Pearson Correlation	1	.949**
	Sig. (2-tailed)		.000
	N	865	865
Development of skills for the digital economy	Pearson Correlation	.949**	1
	Sig. (2-tailed)	.000	
	N	865	865

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between ICT infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon was investigated with

the use of the Pearson product-moment correlations. From the above table, linear correlations between ICT infrastructure and equipment and the development of skills for the digital economy were observed to be statistically significant (***P***= 0.000 ≤ *0.00005*). The Pearson's correlation coefficient ***r*** = 0.949 indicates that ICT infrastructure and equipment and the development of skills for the digital economy are strongly correlated, (***r*** = 0.949, ***P***= 0.000 ≤ *0.00005*). This confirms the alternative hypothesis, while the null has been rejected, hence confirming the fourth research hypothesis. This implies that the problem of development of skills for the digital economy is statistically blamed on poor state of ICT infrastructure and equipment in the schools.

4.4.5. Verification of Research Hypotheses Five

RH5: There is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary school students.

H0: There is no correlation between teaching methods and the development of skills for the digital economy amongst secondary school students.

Ha: There is a strong correlation between teaching methods and the development of skills for the digital economy amongst secondary school students

Table 33: correlations between teaching methods and the development of skills for the digital economy amongst secondary school students (Source: statistical analysis)

		Teaching Methods	**Development of skills for the digital economy**
Teaching Methods	Pearson Correlation	1	.762**
	Sig. (2-tailed)		.000
	N	865	865
Development of skills for the digital economy	Pearson Correlation	.762**	1
	Sig. (2-tailed)	.000	
	N	865	865

**. Correlation is significant at the 0.01 level (2-tailed).

The relationship between teaching methods and the development of skills for the digital economy amongst secondary school students was investigated with the use of the Pearson product-moment correlations. From the above table, linear correlations between teaching methods and the development of skills for the digital economy amongst secondary school students were observed

to be statistically significant (***P***= 0.000 ≤ *0.00005*). The Pearson's correlation coefficient ***r*** = 0.762 indicates that teaching methods and the development of skills for the digital economy amongst secondary school students is strongly and positively correlated, (***r*** = 0.762, ***P***= 0.000 ≤ *0.00005*). This confirms the alternative hypothesis, while the null has been rejected, hence confirming the fifth research hypothesis. This means that the problem of developing skills for the digital economy amongst secondary school students is statistically blamed on weak mastery of Technology-related teaching methods by teachers.

Table 34: Synthesis of Results (Source: statistical analysis)

Hypotheses	Alpha	Degree of significance	Correlation coefficient	Decision
RH_1: policy design			0.881**	Confirmed
RH_2: Program/curricula			0.894**	Confirmed
RH_3: Governance/policy implementation	0.05	0.00	0.919**	Confirmed
RH_4: ICT infrastructure and equipment			0.949**	Confirmed
RH_5: Teaching Methods			0.762**	Confirmed

Looking at the analysis, we realized that all five (5) research hypotheses have been retained indicating the general research hypothesis has been confirmed. This implies that the education system significantly influences the development of skills for the digital economy amongst secondary school students in Cameroon.

CHAPTER FIVE: SUMMARY OF FINDINGS AND DISCUSSION OF RESULTS

This chapter includes a discussion of major findings as related to the literature on the development of skills for the digital economy. It also interprets them from their quantitative and qualitative perspectives in a bid to make proposals that would ameliorate the development of skills for the digital economy. The chapter concludes with a discussion of the limitations of the study, areas for future research, and a brief summary.

5.1. Summary of Findings

The purpose of this research was to determine the extent to which the education system influences the development of skills for the digital economy among secondary school students in Cameroon. In that token, five (05) specific research hypotheses were formulated to guide the researcher. In order to collect the necessary data, a Likert scaled questionnaire, a participant observation and interviews were used. The data were analysed with the Pearson correlation coefficient and the multiple regression analysis. At the end of the analysis, the following results were obtained:

1- There is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon;

2- There is a significant correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon;

3- There is a significant correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon;

4- There is a significant correlation between infrastructure / equipment and the development of skills for the digital economy amongst secondary school students in Cameroon;

5- There is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary students in Cameroon.

5.1.1. Summary of Results According to Research Questions

Research question No. 1: Does policy design significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

There exists a correlation between policy design and the development of skills for the digital economy. With a Pearson's correlation coefficient r = 0.881, the findings statistically indicate that the policy design and the development of skills for the digital economy strongly correlate. This signifies that the problem of developing skills for the digital economy amongst secondary school students in Cameroon is statistically blamed on nature of the e-learning policy design in secondary education.

Findings from questionnaires portray that 70.4% of respondents are not aware of the existence of a relevant digital learning policy designed to guide the use of technology in government secondary schools in Cameroon. Responding to the question on their awareness of the existence of an e-learning plan designed by the Ministry of Secondary Education to guide the use of technology in the classroom, a relative value of 59.4% of respondents disagreed. When asked if the existing policy goals are relevant to the development of digital economy skills, 75.4% of respondents disagreed. On the question measuring how SMART (Specific, Measurable, Achievable, Realistic and Time-bound) is the digital education policy in Cameroon secondary education, 82.2% of respondents disagreed.

Though with divergent views, the interviewees confirmed the existence of a multitude of both external and internal policies that guide the presence of technology in education and skills development in secondary/high schools in Cameroon. According to those officials of both central and devolved services, these policies are relevant, but they require some revisions, redirections or simply reforms to get them aligned to the exigencies of the digital economy. It is clear from these words that a wide range of digital policies exist in this ministry, but there is an absolute need to develop a national policy document on digital education with a unique vision for the Education and Training Sector.

These results confirm that there is a significant correlation between policy and the development of skills for the digital economy amongst secondary school students in Cameroon and therefore collectively confirm research question number one (1).

Research question number two (2): Do programmes and curricula significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

There exists a correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon. The results obtained from the findings show that on an average gotten from the graduates' responses, linear correlations between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant with a Pearson's correlation coefficient of $\boldsymbol{r} = 0.894$.

The exploitation of findings from interviews, participant observation and questionnaires x-ray that 70.2% of respondents disagreed with the fact that course objectives target the development of skills for the digital economy. Also, when asked if there exists a curriculum/course design for digital classrooms (online learning), a proportion of 67.7% of respondents disagreed. And when questioned if there is partnership between the curriculum developers and the labour market sector, on programme/curriculum development, a relative value of 85.6% of respondents disagreed. And when asked if the curriculum is adapted to students with disabilities, a proportion of 77.2% of respondents disagreed.

Findings from our observation show the content of programmes permits the development of few skills for the digital economy (only 3 out of 14); which is just marginal for a full development of the said skills, the programmes should be completely revamped.

Therefore, it can be stated that there is a significant correlation between programmes and curricula and the development of skills for the digital economy amongst secondary school students in Cameroon and therefore collectively confirm research question number two (2).

Research question number three (3): Does governance significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

There is a correlation between governance and the development of skills for the digital economy amongst secondary school students in Cameroon. The results obtained from the findings show that on an average gotten from the graduates' responses, linear correlations between governance and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant with a Pearson's correlation coefficient of $\boldsymbol{r} = 0.919$.

Therefore, characteristics of governance like development of implementation plan, decision-making, e-governance, leadership styles, transparency and accountability, sustainability (finance and maintenance), resource mobilisation, and monitoring and evaluation are influential on students' human skills, digital building block skills and business enabler skills.

Findings from interviews show that when asked if there exists an implementation plan for digital learning in secondary schools, a proportion 79.1% of respondents disagreed. As well, when questioned if there existed e-governance in their schools, 70.6% of graduates disagreed. On the question related to the existence of sustainability in finance and maintenance of digital equipment, 75.2% of respondents disagreed. A contrario when they came to answer the question on transparency and accountability in governance issues, a relative value of 82.7 of respondents agreed. The latter shows that school administrators are using technology in task execution. Also, when asked if there were practical monitoring and evaluation mechanisms only 47.4% of respondents disagreed. This shows that administrators consider feedbacks and reports by various departmental chairs as good enough.

Therefore, we can claim that there is a significant correlation between governance and the development of skills for the digital economy amongst secondary school students in Cameroon and consequently globally confirm research question number three (3).

Research question number four (4): Do infrastructure and equipment significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

There exists a correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon. The results obtained from the findings show that on an average gotten from the graduates' responses, linear correlations between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant with a Pearson's correlation coefficient of $\boldsymbol{r} = 0.949$.

Elements from the participant observation demonstrate that in terms of infrastructure, the Digital Learning Centre comprises 5 studios, a pedagogic block and a conference room. In terms of equipment, there are 12 desktops, 5 smart screens, a video recording system, 200 modems for internet connection, 10 HP Probook laptops, 8Go RAM each, 02 high quality TV cameras, SONY

MC2500 with an SD card of 128 Go, 03 video Projectors, ACER; 2 interactive white boards and 02 external USB hard drives of 4 terra each.

From the findings gotten from the questionnaires, a proportion of 63.2% of respondents strongly said there were no ICT tools like computers that facilitated learning in the classroom environment. When asked if there were 21st century teaching halls (smart classroom environment) on campus, and that students should indicate the functionality and the frequency they visited these halls, 59.8 % of graduates disagreed. On the question related to the existence of updated software devices for the 21st century teaching-learning, 43.9 % of respondents disagreed. The latter demonstrates that LMS are available to a certain degree, but the problem is their usage. These statistics corroborate with the secondary data collected at the Planning Unit of MINESEC whereby the students-computer ratio and the teachers-computer ratio are 33/1 and 6/1 respectively. When asked if there was a high-speed internet connectivity for e-learning 33.2 % of respondents disagreed. One of the most important questions at this level aims to investigate if there were ICT tools adapted to people with disabilities 97.6% disagreed. This poses a problem of inclusion because people with disabilities do not benefit from e-learning as they are supposed to. Also important to note is that the online teaching and evaluation systems are not adapted to their various impairments which can push them out of schools.

Thus, we can confirm that there is a significant correlational relationship between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon and consequently confirm research question number four (4).

Research question number five (5): Do teaching methods significantly correlate with the development of skills for the digital economy amongst secondary school students in Cameroon?

There exists a correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon. The results obtained from the findings show that on an average gotten from the graduates' responses, linear correlations between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon were observed to be statistically significant with a Pearson's correlation coefficient of $\boldsymbol{r} = 0.762$.

The statistics deriving from the questionnaires portray that, a proportion 60.9% of respondents disagree with the fact that their secondary school teachers used the Competence-Based Approach (CBA). This majority denied having effectively followed lessons with the CBA. When asked if the teachers also used Project-Based Approach (PBA) in these high schools, 82% strongly disagreed. On the question aiming at finding out if their secondary school teachers used the Problem-Based Approach, a proportion of 77.6% strongly disagreed. When asked if their teachers used the blended learning method (both online and in blended modes) at high schools, a proportion 71.8% of the respondents strongly disagreed. Also, when asked if their teachers used the Pure Online Approach (POA), a relative value of 73.2% of the respondents strongly disagreed and 8.0% of them disagreed. Finally, when interrogated if the teachers demonstrated the required ICT-teaching skills, 58.6% of the respondents strongly disagreed, while 15.0% disagreed. This state of affairs is a call for attention. The Ministry of Secondary Education prescribes the use of the Competence-Based Approach (CBA) but the practice on the fields reveals a wide range of approaches that can bias the students' core courses performances and 21st century skills development.

Therefore, we state that there is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon and consequently confirm research question number five (5).

5.1.2. Summary of Findings According to Research Hypotheses

The following hypotheses were used in this research work:

- ✓ **Research Hypotheses number one (1): There is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.**

The SPSS (Statistical Package for the Social Sciences) version 26 was used to test the regression level at α(alpha) = 0.05, to either accept or deny the linear significance of the relationship between the variables. The Pearson moment correlation coefficient (r) for policy design and the development of skills for the digital economy amongst secondary school students in Cameroon, had a coefficient of 0.881, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a

strong correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.

This conclusion is supported by the findings from interview exchanges and questionnaires. Findings from interview exchanges show that 80% of interviewees accorded that there exists a handful of major international and national policies and reforms justifying the use of technology in the teaching-learning process in secondary schools. A proportion of 85 % of them asserted that these policies are good, but required to be reshaped to the education and training sector in order to align with the exigencies of today's digital economy and to move towards digital transformation of education in Cameroon.

Findings from questionnaires demonstrate that 70.4% of respondents are not aware of the existence of a relevant digital learning policy designed to guide the use of technology in government secondary schools in Cameroon. Responding to the question on their awareness of the existence of an e-learning plan designed by the Ministry of Secondary Education to guide the use of technology in the classroom, a relative value of 59.4% of respondents disagreed. When asked if the existing policy goals are relevant to the development of digital economy skills, 75.4% of respondents disagreed. On the question measuring how SMART (Specific, Measurable, Achievable, Realistic and Time-bound) is the digital education policy in Cameroon secondary education, 82.2% of respondents disagreed.

Therefore, the respondents collectively held the point that there is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon. The null hypothesis (H0) is scientifically rejected while the alternative hypothesis is scientifically retained. Thus, policy design significantly correlates with the development of skills for the digital economy as shown by both survey analysis and interviews findings.

- ✓ **Research Hypotheses number two (2): There is a significant correlation between programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon.**

The Pearson moment correlation (r) for programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.894, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between programmes/curriculum and the

development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon.

This result is supported by findings from both participant observation and questionnaires. As far as the participant observation is concerned, it has been noted that the content of programmes permits the development of few skills for the digital economy (communication, critical thinking and analytical thinking) out of fourteen (14).

As far as the responses from questionnaires are concerned, 70.2% of respondents disagreed with the fact that course objectives target the development of skills for the digital economy. Also, when asked if there exists a curriculum/course design for digital classrooms (online learning), a proportion of 67.7% of respondents disagreed. When questioned if there is partnership between the curriculum developers and the labour market sector, on programme/curriculum development, a relative value of 85.6% of respondents disagreed. And when asked if the curriculum is adapted to students with disabilities, a proportion of 77.2% of respondents disagreed.

Hence, the respondents collectively held the point that there is a significant correlation between programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon. The null hypothesis (H0) is scientifically rejected while the alternative hypothesis is scientifically retained. Thus, programmes/curriculum correlate with the development of skills for the digital economy as shown by both survey analysis and interviews findings.

Research Hypotheses number three (3): There is a significant correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.919, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there

exists a strong correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon.

A combination of findings from both interviews and questionnaires confirms this result. As far as the interviews are concerned, 80% of interviewed officials noted that state of governance is critical. In that light, research has shown that decentralized and or community models of education governance have emerged successful. This mode of governance has been existing in developed nations whereby the management of the education issue in the hands of the community. This is not the case for most countries of Central Africa of which Cameroon is part. As a matter of fact, the governance of the Cameroon education system has been underpinned by the centralized model. The existence of a digital learning centre in Yaoundé is a wonderful initiative that can be accompanied by regional distance learning centres at the headquarters of every regional capital.

Consequently, the respondents collectively confirmed the point that there is a significant correlation between governance/policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon. The null hypothesis (H0) is scientifically rejected while the alternative hypothesis is scientifically retained. Thus, governance/policy implementation significantly correlates with the development of skills for the digital economy as shown by both survey analysis and interviews findings.

Research Hypotheses number four (4): There is a significant correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.949, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

From an analysis of the interviews, 90% of interviewees noted that despite efforts to equip secondary/high schools through the cyber education project and the one-student-per-laptop

initiative, majority of secondary/high schools still do not have access to computers, internet, and related learning technologies.

In the same light, when interrogated on the existence of updated software devices for the 21st century teaching-learning in their previous secondary schools, 43.9 % of respondents disagreed. The latter demonstrates that LMS are available to a certain degree, but the problem is their usage. These statistics corroborate with the secondary data collected at the Planning Unit of MINESEC whereby the students-computer ratio and the teachers-computer ratio are 33/1 and 6/1 respectively. When asked if there was a high-speed internet connectivity for e-learning 33.2 % of respondents disagreed. One of the most important questions at this level aims to investigate if there were ICT tools adapted to people with disabilities 97.6% disagreed. This poses a problem of inclusion because people with disabilities do not benefit from e-learning as they are supposed to. Also, worthy of note is that the online teaching and evaluation systems are not adapted to their various impairments which can drive them from school.

Therefore, the respondents collectively confirmed the point that there is a significant correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon. The null hypothesis (H0) is scientifically rejected while the alternative hypothesis is scientifically retained. As a matter of fact, infrastructure and equipment significantly correlate with the development of skills for the digital economy as shown by both survey analysis and interviews findings.

Research Hypotheses number five (5): There is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.949, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon.

The statistics deriving from the questionnaires portray that, a proportion 60.9% of respondents disagreed with the fact that their secondary school teachers used the Competence-Based Approach (CBA). This majority denied having effectively followed lessons with the CBA. When asked if the teachers also used Project-Based Approach (PBA) in these high schools, 82% strongly disagreed. On the question aiming at finding out if their secondary school teachers used the Problem-Based Approach, a proportion of 77.6% strongly disagreed. When asked if their teachers used the blended learning method (both online and in blended modes) at high schools, a proportion 71.8% of the respondents strongly disagreed. Also, when asked if their teachers used the Pure Online Approach (POA), a relative value of 73.2% of the respondents strongly disagreed and 8.0% of the disagreed. Finally, when interrogated if the teachers demonstrated the required ICT-teaching skills, 58.6% of the respondents strongly disagreed, while 15.0% said disagree. This state of affairs is a call for attention. The Ministry of Secondary Education prescribes the use of the Competence-Based Approach (CBA) but the practice on the fields reveals a wide range of approaches that can bias the students' core courses performances and 21st century skills development.

Consequently, the respondents collectively confirmed the point that there is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon. The null hypothesis (H0) is scientifically rejected while the alternative hypothesis is scientifically retained. As a matter of fact, infrastructure and equipment significantly correlate with the development of skills for the digital economy as shown by both survey analysis and interviews findings.

5.2. Discussion of Findings

This part lays emphasis on the hypotheses of the study and the findings established. The main objective of this study was to determine the extent to which the education system influences the development of skills for the digital economy among secondary school students in Cameroon. The variables used were: policy design, programmes/curriculum, governance/policy implementation, infrastructure and equipment and teaching methods.

5.2.1. There is a significant correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.

The SPSS (Statistical Package for the Social Sciences) version 26 was used to test the regression level at α(alpha) = 0.05, to either accept or deny the linear significance of the

relationship between the variables. The Pearson moment correlation coefficient (r) for policy design and the development of skills for the digital economy amongst secondary school students in Cameroon, had a coefficient of 0.881, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between policy design and the development of skills for the digital economy amongst secondary school students in Cameroon.

This conclusion is supported by the findings from interview exchanges and questionnaires. Findings from interview exchanges show that 80% of interviewees accorded that there exists a handful of major international and national policies and reforms justifying the use of technology in the teaching-learning process in secondary schools. A proportion of 85 % of them further agreed that these policies are good, but required to be reshaped to the education and training sector in order to align with the exigencies of today's digital economy and to move towards digital transformation of education in Cameroon.

Findings from questionnaires demonstrate that 70.4% of respondents are not aware of the existence of a relevant digital learning policy designed to guide the use of technology in government secondary schools in Cameroon. Responding to the question on their awareness of the existence of an e-learning plan designed by the Ministry of Secondary Education to guide the use of technology in the classroom, a relative value of 59.4% of respondents disagreed. When asked if the existing policy goals are relevant to the development of digital economy skills, 75.4% of respondents disagreed. On the question measuring how SMART (Specific, Measurable, Achievable, Realistic and Time-bound) is the digital education policy in Cameroon secondary education, 82.2% of respondents disagreed.

These results join sharif and Hoff (2016) which posits that ICT requires to seriously be implanted at the primary, secondary and higher levels of education so as to enhanced skills for usability as early as possible. This author concluded that the current policy formulation dimension seriously limits the potentials of learners to the central force of knowledge-based economic competitiveness. Also, Culp, Honey and Mandinach (2003) poorly focused ICT policy for education as mentioned above limits its potentials as a tool for addressing challenges in teaching and learning, and as a change agent.

Also, Yusuf (2005) pointed out that digital education policies in Africa have failed to address the development of a "Nationally relevant context software for school use". This author observed that most of the existing software being used in the schools is imported. It is worth noting that Culp et al., in Malcam (2012) recommend the development of indigenous software to be used in schools.

This result also joins Engozo'o, Fozing and Mutia (2023, P. 21) as they recommend the following to the various stakeholders involved:

- There is need for the harmonization of a technology policy for education at this ministry;
- The policy needs to be updated to meet the needs of the digital economy;
- The Ministry of Secondary Education should ensure schools have a plan for the infusion of ICT in the teaching-learning process;
- School managers are called upon to be effective and efficient in the implementation of education policy related to the development of skills for the digital economy;
- The ministry should constantly follow up to ensure that aspects of inclusion and lifelong learning are well considered in the process;
- The financing and /or provision of resources that enable the effective development of skills for the digital economy should be a priority in the ministry's expenditure. Among other key resources we have modern multimedia centres (well equipped), high bandwidth internet, sustainable energy;
- The ministry and schools should develop and multiply strategies for partnering with key stakeholders in the planning and implementation of technology policy for education;
- Continuous professional development in ICT pedagogic skills for teachers should be enforced;
- School managers should also be trained in e-governance;
- Sustainable management should ensure and enhance accountability and responsibility;
- The ministry should endeavour to align and engage with international ICT standards for education policy, in formulation, strategy and implementation respectively.

To talk of the education sector which is our concern, this policy concentrated on the development of digital skills under human resources development. The target here is to know the main modes of training used by education and training institutions to acquire skills in ICTs. The first is the pre-service training system which constitutes the formal educational system (from primary to higher education) which is required to provide adequate training in ICTs. This move

was to anticipate the increasing digital skills in the nearest future. This was to overcome the inadequacies of the formal educational system and to meet current demands. As a result, many rapid training centres, of various calibres, have been set up and offer introductory courses to office automation and the Internet.

The Ministry of Secondary Education in particular, and the education and Training Sector at large is supposed to develop a policy concentrated on the development of digital skills under human capital development. The target here is to know the main modes of training used by education and training institutions to acquire skills in ICTs. The first is the pre-service training system which constitutes the formal educational system (from primary to higher education) which is required to provide adequate training in ICTs. This move was to anticipate the increasing digital skills in the nearest future. This was to overcome the inadequacies of the formal educational system and to meet current demands. As a result, many rapid training centres, of various calibres, have been set up and offer introductory courses to office automation and the Internet.

The policy design recommended by Engozo'o, Fozing and Mutia (2023) should focus on the following core aspects:

- Policy goals;
- Design of an implementation plan;
- Access, equity and inclusion;
- Partnership between the education planners and the business world;
- Monitoring and evaluation mechanism;
- Sustainability;
- SMART (Specific, Measurable, Achievable, Realistic and Time-bound).

A combination of the findings and all these assertions confirms the positive result obtained on policy design and the development of skills for the digital economy. And thus, give a positive answer to research question number one (1): Does policy design strongly correlate with the development of skills for the digital economy?

5.2.2. There is a significant correlation between programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.894, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null

hypothesis (H0) (There exists no/weak correlation between programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between programmes/curriculum and the development of skills for the digital economy amongst secondary school students in Cameroon.

This result is supported by findings from both participant observation and questionnaires. As far as the participant observation is concerned, it has been noted that the content of programmes permits the development of few skills for the digital economy (communication, critical thinking and analytical thinking) out of fourteen (14).

As far as the responses from questionnaires are concerned, 70.2% of respondents disagreed with the fact that course objectives target the development of skills for the digital economy. Also, when asked if there exists a curriculum/course design for digital classrooms (online learning), a proportion of 67.7% of respondents disagreed. When questioned if there is partnership between the curriculum developers and the labour market sector, on programme/curriculum development, a relative value of 85.6% of respondents disagreed. And when asked if the curriculum is adapted to students with disabilities, a proportion of 77.2% of respondents disagreed.

This problem is compounded in classical secondary schools in Cameroon as graduates are unable to transit to the job market/pick up their first job immediately upon obtaining their GCE AL or Baccalaureate. Worst of it is that these graduates lack creativity and initiative skills to create jobs for themselves and the society in which they have the duty to contribute to its development, (Ngu and Teneng, 2020). Among key worries raised by (Asongwe, 2018; Njebakal and Teneng, 2017; Ngu and Teneng, 2020) is that we are in a knowledge age where by the nature of the work environment has dramatically shifted over time. As a matter of fact, the nature of the work environment has changed from the manufacturing industry model to information-technology oriented. As a result, a key respond by academia or education and training institutions should be to adapt the learning content to this new era.

To corroborate the above premises, Bernie and Charles (2009) developed a set of skills to be included in curriculum design in institutions of learning that have the mandate to develop the 21st century skills on its learners. According to these authors, the content framework or study programmes of colleges and state universities must include career and life skills either as a mainstream or a co-curriculum across every discipline. To Brandon (2016), career and life skills

form part of the digital economy skillset and are crucial for every learning content that aims to prepare participants to excel in today's work environment.

A symbiosis of the findings and all these affirmations confirms the positive result obtained on programmes and curricula and the development of skills for the digital economy. And thus, give a positive answer to research question number two (2): Do programmes and curricula strongly correlate with the development of skills for the digital economy?

5.2.3. There is a significant correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.919, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between governance/Policy implementation and the development of skills for the digital economy amongst secondary school students in Cameroon.

A combination of findings from both interviews and questionnaires confirms this result. As far as the interviews are concerned, 80% of interviewed officials noted that the state of governance is critical. In that light, research has shown that decentralized and or community models of education governance have emerged successful. This mode of governance has been existing in developed nations whereby the management of the education issue in the hands of the community. This is not the case for most countries of Central Africa of which Cameroon is part. As a matter of fact, the governance of the Cameroon education system has been underpinned by the centralized model. The existence of a digital learning centre in Yaoundé is a wonderful initiative that can be accompanied by regional distance learning centres at the headquarters of every regional capital.

It is worth noting like Williamson (2016) that "in the current context of massive digitization and datafication of education, we can now see how new digital instruments are being mobilized to make educational policies (as well as other, more commercialized ambitions) operational. Such instruments are combinations of both technical components and social components that ultimately

partake in a shaping of the ways in which educational realities are seen, known, made amenable to intervention and acted upon—in the pursuit of improvement, accountability or discipline, and so on. The articles in this special issue emphasize how the technical aspects of instruments (the software, its code, algorithms and database architectures) and their social aspects (the organizations and actors producing them, their representations about education, their values and the discursive regimes framing them) combine in the enactment of specific techniques of digital education governance".

These studies, in combination with one another, demonstrate how digitised techniques of educational governance "are now being performed by governmental, technical and commercial actors, through schools and universities, in classrooms, lecture halls, examination settings, online e-assessments and in professional sites of learning, and through specific coded devices, algorithmic forms of analysis and other data practices that are embedded in vast new data infrastructures for the creation and communication of knowledge about education. These developments register a structural shift in educational governance, from the formal organs of government to a more distributed range of commercial, international and non-governmental actors working in networks" (Ball, 2012). New kinds of data actors, such as the analysts and data scientists at Pearson, the OECD, Ofsted and within schools and universities themselves "are being brought into being; new data careers are available for specialists, or 'algorithmists', with the expertise to turn educational data into useful intelligence that might shape the decision-making of policymakers, influence the interventions made by educational leaders or the pedagogic decisions made by teachers or even shape the choices of parents and learners themselves" (Ball, 2012).

However, "new techniques of governing are also enabled by the specific affordances of the digital instruments they employ. For example, real-time digital data technologies make it possible to provide fine-grained assessments and analyses of individuals, and to activate interventions automatically within digitized classrooms, seminar rooms and online courses rather than through the bureaucratic organs of government. Schools' data dashboards make their progress visible, and can be used to hold them accountable. Policymakers may also be influenced by digital decision-support systems that augment human decision-making with automated data analytics capacities. Individuals, including learners at all stages, teachers, academics, educational leaders, examiners, inspectors and even policymakers themselves, are thus to be governed up-close by increasingly automated management machines that are programmed into existence in competitive commercial and international organizations—their actions, behaviours and comportment within education

institutions shaped, enabled or constrained, ultimately, by the models and values programmed in to digital systems. Software and data companies and agencies are becoming dominant sites for the instrumentation of education", (Ball, 2012).

This state of affairs joins Fonkeng (2009) when declaring that the centralized model has fallen short of identifying and repairing real education problems. Today, the education system is in total dilemma as the confidence bestowed on its mission to equip learners with the right skills to face the 21st century job market has been dashed.

In the same vein, Teneng and Ngu (2021), make it clear that the goal of digital governance in education is to embed an understanding of technology-enabled education within the roles and responsibilities of educational managers, and to set the ball rolling across the educational system. Therefore, educational leaders at all levels must firmly and consistently lead all stakeholders of the education community: students, parents, teachers, education administrators, government officials and policy makers towards learning goals that are rigorous and relevant knowledge, understanding and proficiency in digital economy skills. As a result, the digital framework for the education sector must consider putting in place a strong implementation plan. It suffices to mention the purpose of digital policy governance before delving into its operationalization properly.

A combination of the findings and all these assertions confirms the positive result obtained on governance/policy implementation and the development of skills for the digital economy. And thus, give a positive answer to research question number three (3): Does governance/policy implementation strongly correlate with the development of skills for the digital economy?

5.2.4. There is a significant correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.949, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between infrastructure and equipment and the development of skills for the digital economy amongst secondary school students in Cameroon.

From an analysis of the interviews, 90% of interviewees noted that despite efforts to equip secondary/high schools through the cyber education project and the one-student-per-laptop initiative, majority of secondary/high schools still do not have access to computers, internet, and related learning technologies.

In the same light, when interrogated on the existence of updated software devices for the 21st century teaching-learning in their previous secondary schools, 43.9 % of respondents disagreed. The latter demonstrates that LMS are available to a certain degree, but the problem is their usage. These statistics corroborate with the secondary data collected at the Planning Unit of MINESEC whereby the students-computer ratio and the teachers-computer ratio are 33/1 and 6/1 respectively. When asked if there was a high-speed internet connectivity for e-learning 33.2 % of respondents disagreed. One of the most important questions at this level aims to investigate if there were ICT tools adapted to people with disabilities and 97.6% disagreed. This poses a problem of inclusion because people with disabilities do not benefit from e-learning as they are supposed to. Also worth to note is that the online teaching and evaluation systems are not adapted to their various impairments which can push them out of schools.

This result joins WSIS (2003) when he coins that, "Infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all …" and calls upon governments "…to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services". The commitment of policy on ICT infrastructure is essential for the development of digital economy skills has been the subject of heated debate on the integration of `technology in the classroom in this digital age. According to Karenti et al., (2009), the integration of ICT in the classroom in sub-Saharan Africa has as its principal obstacle, the 21st century digital infrastructure. In a pan African study carried in 2012 on the integration of ICT in the classroom, this author discovered that very few schools in Cameroon owned a computer laboratory for learning. They equally pointed out that, teachers and learners in particular require sufficient access to digital hardware and software before any integration can be considered effective.

UNESCO (2018) corroborates the above point as she indicated that the omnipresence of digital materials in all its forms and dimensions is crucial for today's learning environment and the development of the skills for the digital workplace. She also lamented that the low presence of smart boards, multimedia centres in schools, and the absence of school-based leaning platforms has unprecedentedly hindered their use in the teaching-learning process. In the same light, COL

(2015) posits that ICT in education policies must focus on strong issues by promoting access to ICT and reaching specific ICT targets related to computers, computer labs and internet connectivity at educational institutions. In the case of Cameroon, the presidential gift of the "one-student one-laptop" project launched since 2017 has been termed by experts as laudable. However, the question of quality and sustainability is still begging for an answer as will be seen in the findings of this study.

Also, the question of multimedia centres in secondary and primary schools in Cameroon is also a heated debate in all its forms. According to Béché (2020), the absence of such centres in schools confirms the emptiness of the Cameroon educative system in the face of crisis like the Covid-19 pandemic. In connection to this, Akumbu, Teneng and Ngu (2021) indicated that the focus should go beyond multimedia centres to the creation of multimedia classrooms in all educational institutions. These authors advanced that learning can be more interesting, motivating, and easy in classrooms with smart boards, internet connectivity, and iPad or computers for all learners. It therefore suffices to note that key equipment that are typical of a smart classroom include: interactive white board, projectors, interactive LED/LCD panels, digital podium, speakers and wireless microphones, etc.

Apart from this hardware required in today's classroom, it is also imperative for digital strategies in secondary education to consider various software that can be used in the teaching-learning process from research, lesson presentation, and evaluations. Reference can be made to the literature on digital teaching-learning methods for more knowledge on these applications. In a nutshell, little has been done on the crating of specific contextual software that supports leaning in the Cameroonian context, except for importation of foreign built apps, that do consider our diverse cultural background.

Broadband internet in schools

In connection to the above, UNESCO (2016) explains that the availability of a strong broadband internet is critical for the existence and survival of online learning. In this light, Béché (2019) held that internet connection is required for any successful online interaction. It is not only necessary for connecting with learners, but for research by all to obtain information online. In this light, karsenti (2009) contends that very few or no secondary schools have been noted to have internet connections to use in online learning. A report by the Ministry of telecommunication indicated that the affordability of internet by Cameroonian is a call for concern. In this light,

Teneng and Ngu (2020), reports that the section 8 of the 2019 finance law introduced taxes on software and application downloads outside of Cameroon at a flat rate of CFA 200 francs, equivalent to 0.34 United States Dollars per download. This is happening at the time when the current average cost per 1GB is CFA 2,000 (3.4 USD) per month. It also suffices to note the average wage is CFA 36, 270 per month. Recent reports by the world Bank on the poverty rate in Cameroon shows an increase from 24.5% in 2019 to 25.3% in 2021 (World Bank, 2021). What can be deduced from these figures is that the cost of affording internet is relatively expensive for an average Cameroonian to strongly engage in research and online learning.

The question of steadily available electricity

Besides, the problem of electricity has been the highest obstacle for the smooth functioning of digital mechanisms in our schools. According to UNESCO (2017), electricity is of crucial importance in the facilitation of school activities and overall, significantly improves the learning environment. For instance, it provokes unnecessary cancellation of learning due to ill-lighted classroom, and poor power supply for computers, the internet and related learning tools. To corroborate the above, UNESCO statistics on schools' access to electricity depicts that 91% of schools in Cameroon still suffer from access to steady electricity, UNESCO (2016). In recent times, the problem of unsteady electricity has increasingly hindered the use of digital tools in the school milieu. It has even been observed that the National Electricity supply company in Cameroon known as ENEO (The Energy of Cameroon) has recently resolved to the constant rationing of power geographically. This has really slowed work, both in the offices, classrooms, and households that used technology.

This result should be a call for attention in other to improve infrastructure and equipment at the macro, meso; chrono, onto, exo and micro levels of MINESEC.

Our findings and all these affirmations confirm the positive result obtained on infrastructure and equipment and the development of skills for the digital economy. And thus, give a positive answer to research question number four (4): Do infrastructure and equipment strongly correlate with the development of skills for the digital economy?

5.2.5. There is a significant correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon.

The Pearson moment correlation (r) for teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon, has a coefficient of 0.949, significance stood at 0.01 level (2-tailed). We therefore scientifically reject the null hypothesis (H0) (There exists no/weak correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon) and consequently retain the alternative hypothesis (Ha). Therefore, there exists a strong correlation between teaching methods and the development of skills for the digital economy amongst secondary school students in Cameroon.

The statistics deriving from the questionnaires portray that, a proportion 60.9% of respondents disagreed with the fact that their secondary school teachers used the Competence-Based Approach (CBA). This majority denied having effectively followed lessons with the CBA. When asked if the teachers also used Project-Based Approach (PBA) in these high schools, 82% strongly disagreed. On the question aiming at finding out if their secondary school teachers used the Problem-Based Approach, a proportion of 77.6% strongly disagreed. When asked if their teachers used the blended learning method (both online and in blended modes) at high schools, a proportion 71.8% of the respondents strongly disagreed. Also, when asked if their teachers used the Pure Online Approach (POA), a relative value of 73.2% of the respondents strongly disagreed and 8.0% of the disagreed. Finally, when interrogated if the teachers demonstrated the required ICT-teaching skills, 58.6% of the respondents strongly disagreed, while 15.0% said disagree. This state of affairs is a call for attention. The Ministry of Secondary Education prescribes the use of the Competence-Based Approach (CBA) but the practice on the fields reveals a wide range of approaches that can bias the of development 21st century skills and the students' performances in core courses.

The above reaffirmation brings us to note that traditional classroom teaching was designed for another age, and that we are now in a different age that requires purely different methods. This key shift is towards greater emphasis on the 21st century skills, particularly knowledge management, work related in general and the digital economy in particular. In other words, we need design models for teaching and learning that leads to the development of the skills needed in the knowledge –based age or the digital age. The digital teaching-learning framework in this study

is viewed in terms of e-learning teaching methods and teachers' ICT pedagogic competencies. This will be discussed in details below.

In recent years, there have been significant research and findings on course delivery methods that match the exigencies of the 21st century skill development. According to Karsenti et al., (2009), the omnipresence and omnipotence of technology in today's learning environment have disrupted the case teaching methods significantly. These authors further pointed out that the challenge is evident in classrooms in sub-Saharan Africa as there is still much work to be done in terms of digital policy and practice in education. However, several e-learning teaching-learning strategies are currently being used in classroom across the globe. What remains unfortunate is how different education systems accept to use them, and the extent to which nations are ready to integrate them. An unending list of these e-learning teaching strategies exists, but study will treat a hand few mostly under blended learning and online learning models.

The Solution for the teaching approach: the Blended learning

The traditional face-to-face, in-person, classroom-based, has been used for centuries as the ubiquitous delivery method. "It is only in recent years with the technology revolution that distance learning or technology-enabled learning has become famous". According to the U.S. Department of Education (Means, Toyama, Murphy, Bakia and Jones, 2009), "a blended classroom and web-based teaching and learning offers access to the widest range of leaners modes and methods for developing students' skills. As almost all of us in this room have done a larger part of our learning in-person and classrooms, we usually refer to the combination of face-to-face and online learning as a special form of learning called "Blended learning". According to Bonk and Graham, (2006), "blended learning is part of the ongoing convergence of two archetypal learning environments. The simplest definition of the term blended learning is the use of traditional classroom teaching methods together with the use of online learning for the same students studying the same content in the same course. It is a thoughtful fusion of online learning experiences and face-to-face" (Garrison and Vaughan, 2008). There are also blended programmes in which students study some courses in face-to-face classrooms and others fully online.

According to Béché (2013), technology for learning has been readily available. This author posits that the importance of blending learning is now evident as it impacts for all actors on the learning environment is now causing a positive change in the development of skills of the digital economy. This is also because there is more clarity about how to use both in-person and online teaching or blending the two. This is equally based on many research findings on blended learning

which shows an increase in learners' ability to learn collaboratively, think creatively, study independently and tailor their own learning experiences to meet their individual needs.

Blended learning can also be defined as a term applied to the practice of providing instruction and learning experiences through the combination of technology-enabled learning and face-to-face model. It suffices to note that during the technology-mediated component of these learning experiences, students are not required to be physically together in one place but may be connected digitally through online communities. For example, one blended course could involve students attending a class taught by some teachers in a traditional classroom setting while also completing online components of the course independently, outside of the classroom, on an online platform. Classroom instruction time may be replaced or augmented by online learning experiences, and online learning experiences, can include varying degrees of interaction or just time alone in independent study and learning activities. However, in a quality blended experience, the content and activities of both face-to-face and online learning are integrated with one each other and work towards the same learning outcomes with the same content. These various learning contents are synthesized, complement each other, and are planned or orchestrated to run in parallel.

The findings, coupled with all these assertions give a perfect response to research question number five (5): Do teaching methods strongly correlate with the development of skills for the digital economy?

5.3. Limitations of the Study

In the course of carrying out this research, we faced some constraints that impeded rather than assisted us in the field. These included:

- The absence of an emphasis on teachers' competence: This research would be richer if we also took into account the development of teachers' competence so as to develop a framework for 21st century teacher's competences that could positively influence the "teachability and learnability" of skills for the digital economy;
- The lack of a thoroughly address of the external validity of the findings: this study would gain by presenting the broader applicability of the research outcomes beyond the specific context of Cameroon;

- Bottlenecking in the search of data: in our struggle to get access to primary or secondary data, it would take several weeks to have access to information in central services as well as regional delegations. This really affected the time frame we fixed for data collection;

- Respondents and interviewees with a busy schedule: some of them collected questionnaires but could not return them in time or never returned them because of time. Some openly asked for financial motivation before they cooperate. As mitigation measure, we provided them with some financial motivation;

- The absence of focus group discussions: More credibility could be given to this study if coupled with a focus group discussion. Unfortunately, the governmental restrictive measures to curb the Covid 19 pandemic and the sociopolitical crisis in the South-West and Northwest regions of the country did not permit us to meet the various strata of our sample at the same venue and have discussions with them on the development of skills for the digital economy. The subsequent statistical analysis, may offer more evidence to strengthen the data discovered;
- Explaining the concepts of skills for the digital economy to respondents: When we got to the field, we had to work with some of the respondents and the participants for over 2 months for them to understand the purpose of the research and the terminology related to its field. Since the respondents were spread in 4 different regions of the country.
  All these made the work of the researcher very demanding in terms of time and finances.

CHAPTER SIX: PROPOSALS TO IMPROVE ON THE DEVELOPMENT OF SKILLS FOR THE DIGITAL ECONOMY AND AREAS FOR FUTURE RESEARCH

In the light of the results of our findings, some limitations have been identified and, we make the following proposals for the development of skills for the digital economy. These proposals address the various stakeholders of the education and training sector, parliamentarians/senators, technical and financial partners, regional and local authorities, the educational community, parents. The said proposals shall be presented by variable. Also, we draw a look at the potential types of research that can be conducted in the area of digital skills development.

6.1. Proposals

6.1.1. Proposals for Policy Design

- **To parliamentarians and senators/The Education and Training Sectoral administrations**

The results of this study have confirmed the absence of a national policy for digital/distance education. In a top-bottom system like ours, we first and foremost propose an amendment of Law no. 98/004 of 14 April 1998 to lay down guidelines on education in Cameroon, as follows:

REPUBLIC OF CAMEROON **PEACE – WORK – FATHERLAND**

************ ************

LAW No. _____ OF _____

To Amend and Supplement certain Provisions of Law No. 98/004 of 14 April 1998 to Lay Down Guidelines for Education in Cameroon

The National Assembly deliberated and adopted,
The President of the Republic hereby enacts
the law set out below:

Amendment of Law no. 98/004 of 14 April 1998 to lay down guidelines on education in Cameroon

Section 1: The provisions of sections 5 and 23 of Law no. 98/004 of 14 April 1998 to Lay down Guidelines for Education in Cameroon are hereby amended and supplemented as follows:

Section 5: (New) On the basis of the general purpose defined in Section 4 above, the objectives of education shall be to:

1- Train citizens who are firmly rooted in their culture but open to the world and respectful of the general interest and the common wealth;
2- Inculcate the major universal ethical values which are dignity and honour, honesty and integrity as well as a sense of discipline into pupils and students;
3- Promote family life;
4- Promote national languages;
5- provide an introduction to the democratic culture and practice, respect of human rights and freedoms, justice and tolerance, the fight against all forms of discrimination, the love for peace and dialogue, civic responsibility and the promotion of regional and sub-regional integration;
6- Cultivate the love for effort and work well done, the quest for excellence and team spirit;
7- Equip pupils and students with 21st century skills which are creativity, collaboration, communication, critical thinking, analytical thinking, data management, data analysis, software development, computer programming, computer programming, digital security and privacy, communicating data, digital design, project management and business process;
8- provide physical, spots, artistic and cultural training for the child;
9- Provide hygiene and health education.

Section 23: (New) (1) Education shall be provided through a combination of face-to-face and distance learning. Face-to face learning shall take place in the following establishments:

- ✧ Preschools;
- ✧ Primary schools;
- ✧ General education colleges and high schools;
- ✧ Technical and vocational education colleges for high schools;
- ✧ Post-primary schools;
- ✧ General and technical teacher training colleges.

(2) Distance learning shall be offered through the following means:

- ✧ Internet;
- ✧ Television;
- ✧ Radio;
- ✧ Correspondences.

Section 2: This law, which repeals all previous repugnant hereto, shall be registered, published according to the procedure of urgency and inserted in the Official Gazette in English and French.

Yaoundé, _____

The President of the Republic,

- **To the Education and Training Sectoral administrations, Technical and Financial Partners, the private sector, Civil Society Organisations, Regional and Local Authorities, we proposed the following draft copy of National Policy Document on the Development of Skills for the Digital Economy.**

REPUBLIQUE DU CAMEROUN

Paix – Travail – Patrie

****

REPUBLIC OF CAMEROON

Peace - Work – Fatherland

****

National Policy Document on the Development of Skills for the Digital Economy -Draft copy-

Month and year of publication

English Version

Contents

2.3. Governance and Partnership

This strategic area aims to establish the legislative and regulatory framework for digital education in Cameroon, to equip pupils and students with 21st century skills by formalising partnerships with a view to financing this policy through the various agreements.

Digital Education, Training and Employability

The aim here is to develop a policy for the development of skills for the digital economy, by the end of which all young people, without discrimination, should be equipped with 21st century skills in a bid to be socially integrated, competent and capable of accessing a decent job.

1. **Budget Framing**

The framing allows for an analysis of the cost implications of the actions selected in this policy. The estimated costs per action are as follows:

- Increasing access to digital education and training institutions: CFA … Francs;
- Improving the participation of learners from all strata in the teaching-learning processes and in evaluation systems: CFA … Francs;
- Adapting the curriculum and programmes so as to teach as core courses or mainstream: CFA … Francs;
- Improving governance and developing partnerships: CFA … Francs.

For a total cost of CFA … Francs

2. **Financing, Steering and Monitoring/Evaluation of the Policy**

The financing plan for this policy provides for two types of financing: public and private. Public financing will mobilize up to 65% through ministerial budget allocations and contributions from regional and local authorities. Private financing will be mobilized up to 35% and will be made up of contributions from Technical and Financial Partners and bilateral and multilateral cooperation on the one hand, and Civil Society Organizations on the other.

To optimize its implementation, the Government will set up a steering committee chaired by the Prime Minister, Head of Government, with the sectoral ministers concerned as members. This committee will be responsible for: validating the three-year and annual action plans of the stakeholders, evaluating the implementation of the policy and validating the financing plan.

This is a summary of the main lines of this National Policy on the Development of Skills for the Digital Economy, whose main objective is to equip pupils and students with 21st century

skills citizens, in order to provide the job market with sufficient and good quality human capital to boost Cameroon's economic and social development.

3. Introduction

Demographic context

Social context

Political context

Humanitarian context

Health context

The main parts of the policy: **conceptual, strategic, and operational frameworks**

Part One: Conceptual Framework

I .1. Situational Analysis of on the Development of Skills for the Digital Economy in Cameroon

I.1.1. Access to Education and Training Institutions

I.1.2. Situation of Access to Digital Education in Ministries

I.1.2.1. Situation at the Ministry of Basic Education

I.1.2.2 Situation at the Ministry of Secondary Education

I.1.2.3. Situation at the Ministry of Higher Education

I.1.2.4. Situation at Ministry of Employment and Vocational Training

I.1.2.5. Situation at Ministry of Youth and Civic Education

I.1.2.5. Situation at Ministry of Scientific Research and Innovation

I.1.4. Development of a Digital Educational Environment

I.1.5. The Digitalisation of Teaching-Learning Transactions and Assessments

I.1.5.1. Education Programmes, Assessments, Examinations, and Certification

I.1.5.2. Organisation and Management of the Teaching-Learning Process

I.1.5.3. Teacher/Trainer Training, Deployment and Retention

I.1.5.4. Research for the Development of Educational Resources

I.1.5.5. Use of Educational Technologies

I.1.6. Governance and Partnership Development

I.1.6.1. Legislation and Advocacy

I.1.6.2 Partnership and Collaboration

I.2. Diagnosis (SWOT Analysis)

I.2.1. Internal Environment

I.2.1.1. Strengths

I.2.1.2. Weaknesses

I.2.2. External Environment

I.2.2.1. Opportunities

I.2.2.2. Threats

I.3 Challenges of Digital Education in Cameroon

Part II: Strategic Framework

II.1 Strategic Orientations

II.1.1. Foundations of the National Digital Education Policy

International Context

National Context

II.1.2. Vision of the Policy

This policy aims to ensure that by 2028 at least 60 % of pupils, students and learners have access to equitable, inclusive and quality digital education, in a bid to develop their skills for the digital economy nationwide. More precisely, this vision aims to:

1- Ensure pupils/students and learners have the skills they need to meet the demands of an ever-changing economy and society, and that employers invest in the skilled employees they need to grow their businesses;
2- Establish Cameroon as a world-class entrepreneurial nation;
3- Strengthen Cameroon's position in new markets and industries and generate new, well-paid jobs from a just transition to net zero;
4- Make Cameroon's businesses, industries, regions, communities, and public service more productive and innovative;
5- Reorient our economy towards wellbeing and fair work, to deliver higher rates of employment and wage growth, to significantly reduce structural poverty;
6- Provide an intelligence-led system with an agile, responsive, resilient, and inclusive skills ecosystem that consistently delivers the skills the Cameroonian economy needs.

II.1.3. Development Plan for the Policy by Sub-sector from 2024 to 2028

Development plan by sub-sector for the period 2024 - 2028																			
No.	**Subsector**	**Education cycle**	**Number of targeted regional studios for Digital education**	**Number of digital tools to be acquired**		**Number of Computers and ICT devices to be acquired for students**		**Number of Computers and ICT devices to be acquired for teachers**		**Total number of Computers and ICT devices to be acquired for both students and teachers**		**Internet Broadband Speed to be supplied to schools**		**Number of targeted teachers to be trained per cycle**		**Number of targeted supervisors to be trained**		**Number of targeted pupils/learners per Cycle**	
1	**MINEDUB**	- Preschool - Primary - Literacy - Non-Formal Basic Education	40 (1x4cycles x10 regions)	MS Teams		Desktop computers		Desktop computers		Desktop computers		144kbps (excl.) – 2mbps (incl.)		Preschool		Preschool		Preschool	
				H5P	10	laptops		laptops		laptops									
				Cabinet	10	Tablets		Tablets		Tablets		2mbps (excl.) – 5mbps (incl.)		Primary		Primary		Primary	
				WebLearn	10	Mini notebooks		Mini notebooks		Mini notebooks									
				Vevox	20	notebooks		notebooks		notebooks		5mbps (excl.) – 10mbps (incl.)							
				Miro	10	Digital reader		Digital reader		Digital reader									
				CalssVR	10	E-Books		E-Books		E-Books		10mbps (excl.) –		Literacy		Literacy		Literacy	
				Inspera	10	E-workbooks		E-workbooks		E-teachers' books									

												30mbps (incl.)							
				Rapidmooc	10	E-newspapers		E-newspapers		E-newspapers		30mbps (excl.) – 100mbps (incl.)							
				Turnitin	10	Mobile phones		Mobile phones		Mobile phones				Non-Formal Basic Education		Non-Formal Basic Education		Non-Formal Basic Education	
				Ally	10	Interactive whiteboards		Interactive whiteboards		Interactive whiteboards		Above 100 mbps							
				LaTeX Math Editor	10	Digital cameras		Digital cameras		Digital cameras									
				Replay	10	Data projectors		Data projectors		Data projectors									

Total MINEDUB																							
No.	**Subsector**	**Type of education/ training structure**	**Number of targeted regional studios for Digital education**	**Number of digital tools to be acquired**		**Number of Computers and ICT devices to be acquired for students**		**Number of Computers and ICT devices to be acquired for teachers**		**Total number of Computers and ICT devices to be acquired for both students and teachers**		**Internet Broadband Speed to be supplied to schools**		**Number of targeted teachers to be trained per cycle**		**Number of targeted supervisors to be trained**		**Number of targeted pupils/learners per Cycle**	
2	**MINESEC**	- SGE - TVE - Teacher Education	31 (1x3cycles	MS Teams		Desktop computers		Desktop computers		Desktop computers		144kbps (excl.) – 2mbps (incl.)		SGE		SGE		SGE	
				H5P	10	laptops		laptops		laptops									

			x10regions + 1 for the DEC)	Cabinet	10	Tablets		Tablets		Tablets		2mbps (excl.) – 5mbps (incl.)						
				WebLearn	10	Mini notebooks		Mini notebooks		Mini notebooks								
				Vevox	20	notebooks		notebooks		notebooks		5mbps (excl.) – 10mbps (incl.)		TVE		TVE		TVE	
				Miro	10	Digital reader		Digital reader		Digital reader								
				CalssVR	10	E-Books		E-Books		E-Books		10mbps (excl.) – 30mbps (incl.)						
				Inspera	10	E-workbooks		E-workbooks		E-teachers' books								
				Rapidmooc	10	E-newspapers		E-newspapers		E-newspapers		30mbps (excl.) – 100mbps (incl.)		Teacher Education		Teacher Education		Teacher Education	
				Turnitin	10	Mobile phones		Mobile phones		Mobile phones								
				Ally	10	Interactive whiteboards		Interactive whiteboards		Interactive whiteboards		Above 100 mbps						
				LaTeX Math Editor	10	Digital cameras		Digital cameras		Digital cameras								
				Replay	10	Data projectors		Data projectors		Data projectors								
Total MINESEC																		

No.	Subsector	Type of education/ training structure	Number of targeted University studios for Digital education	Number of digital tools to be acquired		Number of Computers and ICT devices to be acquired for students	Number of Computers and ICT devices to be acquired for lecturers	Total number of Computers and ICT devices to be acquired for both students and lecturers	Internet Broadband Speed to be supplied to universities	Number of targeted lecturers to be trained per faculty	Number of targeted supervisors to be trained	Number of targeted students per university
3	**MINESUP**	FALSH Faculty of Science Faculty of Law	11 (1x11 State universities)	MS Teams		Desktop computers	Desktop computers	Desktop computers	144kbps (excl.) – 2mbps (incl.)	FALSH	FALSH	FALSH
				H5P	11	laptops	laptops	laptops				
				Cabinet	11	Tablets	Tablets	Tablets	2mbps (excl.) – 5mbps (incl.)			
				WebLearn	11	Mini notebooks	Mini notebooks	Mini notebooks				
				Vevox	11	notebooks	notebooks	notebooks	5mbps (excl.) – 10mbps (incl.)	Faculty of Science	Faculty of Science	Faculty of Science
				Miro	11	Digital reader	Digital reader	Digital reader				
				CalssVR	11	E-Books	E-Books	E-Books	10mbps (excl.) – 30mbps (incl.)			
				Inspera	11	E-workbooks	E-workbooks	E-teachers' books				

				Rapidmooc	11	E-newspapers		E-newspapers		E-newspapers		30mbps (excl.) – 100mbps (incl.)		Faculty of Law		Faculty of Law		Faculty of Law	
				Turnitin	11	Mobile phones		Mobile phones		Mobile phones									
				Ally	11	Interactive whiteboards		Interactive whiteboards		Interactive whiteboards		Above 100 mbps							
				LaTeX Math Editor	11	Digital cameras		Digital cameras		Digital cameras									
				Replay	11	Data projectors		Data projectors		Data projectors									
Total MINESUP																			

No.	Subsector	Type of education/ training structure	Number of targeted training centres	Number of digital tools to be acquired		Number of Computers and ICT devices to be acquired for learners		Number of Computers and ICT devices to be acquired for facilitators		Total number of Computers and ICT devices to be acquired for both learners and facilitators		Internet Broadband Speed to be supplied to training centres		Number of targeted lecturers to be trained per training centre		Number of targeted supervisors to be trained		Number of targeted learners per training centre	
4	**MINEFOP**		11 (1x122 training centres)	MS Teams		Desktop computers		Desktop computers		Desktop computers		144kbps (excl.) – 2mbps (incl.)							
				H5P	11	laptops		laptops		laptops									
				Cabinet	11	Tablets		Tablets		Tablets		2mbps (excl.) – 5mbps (incl.)							
				WebLearn	11	Mini notebooks		Mini notebooks		Mini notebooks									
				Vevox	11	notebooks		notebooks		notebooks		5mbps (excl.) – 10mbps (incl.)							
				Miro	11	Digital reader		Digital reader		Digital reader									
				CalssVR	11	E-Books		E-Books		E-Books		10mbps (excl.) – 30mbps (incl.)							
				Inspera	11	E-workbooks		E-workbooks		E-teachers' books									

				Rapidmooc	11	E-newspapers		E-newspapers		E-newspapers		30mbps (excl.) – 100mbps (incl.)						
				Turnitin	11	Mobile phones		Mobile phones		Mobile phones								
				Ally	11	Interactive whiteboards		Interactive whiteboards		Interactive whiteboards		Above 100 mbps						
				LaTeX Math Editor	11	Digital cameras		Digital cameras		Digital cameras								
				Replay	11	Data projectors		Data projectors		Data projectors								
Total MINEFOP																		

No.	Subsector	Type of education/ training structure	Number of targeted training centres	Number of digital tools to be acquired		Number of Computers and ICT devices to be acquired for learners		Number of Computers and ICT devices to be acquired for facilitators		Total number of Computers and ICT devices to be acquired for both learners and facilitators		Internet Broadband Speed to be supplied to training centres		Number of targeted lecturers to be trained per training centre		Number of targeted supervisors to be trained		Number of targeted learners per training centre	
5	**MINJEC**		11 (1x71 training centres)	MS Teams		Desktop computers		Desktop computers		Desktop computers		144kbps (excl.) – 2mbps (incl.)							
				H5P	11	laptops		laptops		laptops									
				Cabinet	11	Tablets		Tablets		Tablets		2mbps (excl.) – 5mbps (incl.)							
				WebLearn	11	Mini notebooks		Mini notebooks		Mini notebooks									
				Vevox	11	notebooks		notebooks		notebooks		5mbps (excl.) – 10mbps (incl.)							
				Miro	11	Digital reader		Digital reader		Digital reader									
				CalssVR	11	E-Books		E-Books		E-Books		10mbps (excl.) – 30mbps (incl.)							
				Inspera	11	E-workbooks		E-workbooks		E-teachers' books									

				Rapidmooc	11	E-newspapers		E-newspapers		E-newspapers		30mbps (excl.) – 100mbps (incl.)							
				Turnitin	11	Mobile phones		Mobile phones		Mobile phones									
				Ally	11	Interactive whiteboards		Interactive whiteboards		Interactive whiteboards		Above 100 mbps							
				LaTeX Math Editor	11	Digital cameras		Digital cameras		Digital cameras									
				Replay	11	Data projectors		Data projectors		Data projectors									
Total MINJEC																			
Total of all ministries																			

The table above describes the development plan for digital education and training provision by sub-sector from 2024 to 2028. This concerns management structures, teaching staff and learners targeted for this period.

II.1.4. Goal

This policy aims to outline the government's major field interventions in the domain of development of skills for digital economy and to provide guidelines for the implementation of these interventions in terms of access and equity, quality and relevance and governance/partnership.

II.1.5. Principles and Values

The following principles and values underpin this policy:

- Every child has the right to a quality education appropriate to his or her life;
- Affordable, reliable and context-sensitive digital education, can promote equal opportunities for girls and boys and reduce inequalities by ensuring every child has access to high quality content;
- Digital education technologies improve fundamental skills such as collaboration, problem solving, global awareness, etc;
- Digital education can easily connect boys and girls from different parts of the world with the possibility of sharing their content with peers living kilometres away;
- Digital education assures the continuity of teaching-learning transactions when a social or health crisis occurs;
- Equally important, learning technology can open future job opportunities.

The policy is designed and implemented using a multi-sectoral and participatory approach.

II.1.6. General Objective

The general objective of the National Policy on the Development of Skills for the Digital Economy is to put in place a mechanism to ensure equal access to all stages of education and vocational training for all sections of the population, including those who are socially vulnerable, in order to improve their pre-schooling, schooling and/or vocational training.

II.1.7. Specific Objectives

To achieve this overall objective, the policy specifically aims to:

- improve access to digital education;
- increase the participation of pupil and students in digital teaching-learning and training processes and in evaluation systems;
- improve governance and partnership development.

II.1.8. Scenarios of the Vision

Three scenarios have been pre-identified: the trend, the progressive and the optimistic.

The **trend scenario** focuses on the current situation of digital education, and capitalises on the first elements of the covid and post-covid 19 experiences of distance learning. Therefore, it does not sufficiently take into account the reforms that the National Policy on the Development of Skills for the Digital Economy is planning. The implementation of this trend does not involve institutional changes. Moreover, its estimated impact on improving the development of skills for the digital economy in the education system remains low.

The **optimistic scenario** relies on a generalised approach to the development of skills for the digital economy in all sub-sectors of the Education and Training Sector, assuming that the entire education system should be digitalised. It extends to all the components of digital education by capitalising on the various past experiences.

As for the **progressive scenario**, it is based on a more inclusive and holistic approach to the development of skills for the digital economy, reflecting the desired situation in a careful manner. It focuses on extending the pre, and post covid 19 experiences of distance education by emphasising the most sustainable elements with significant impact. The scenario involves the implementation of an action plan. The impact of the human capital development is quite significant. This scenario involves increasing public and private funding and partnerships for digital education, and setting up effective management and monitoring-evaluation systems.

The strategic option chosen for National Policy on the Development of Skills for the Digital Economy (NPDSDE) was based on four criteria: contributing to the achievement of the objectives of pillar 2 of the NDS30 relating to the human capital development; contributing to the access and equity aspect of the sectoral strategy; contributing to the quality and relevance aspect, and contributing to the achievement of SDG4, target 4.4: By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship. It explores Indicator 4.4.1: the

proportion of youth/adults with information and communications technology (ICT) skills, by type of skill. Both the target and the indicator reflect a forward-looking commitment by Cameroon.

For each of these criteria, the following indicators have been identified:

- Concerning the criterion on achieving the objectives of Pillar 2 relating to the human capital development of the NDS30:
  - human Capital Index;
  - living standards and well-being index;
  - success rate of learners in examinations and certifications;
  - completion rates of learners at the end of every cycle.
- As regards the second criterion on the contribution to the achievement of the NDS30:
  - reducing disparities and inequalities.
- Regarding the criterion concerning the contribution to the access and equity aspect of the sectoral strategy:
  - The percentage of youths (people aged 15 to 24 years) and adults (aged 15 years and older) who have undertaken certain computer-related activities in a given period (e.g. the previous three months);
  - The percentage of pupils and students in a given population who say "yes" when asked if they have used ICT skills, for example, inside or outside their school or workplace, have used those skills for a minimum amount of time, and have access to the Internet;
  - The level of proficiency of users. A high value indicates that a large share of the reference population has the required ICT skills.
- The contribution to the quality and relevance aspect, the contribution to the achievement of SDG4, target 4.4:
  - the level of adaptation of school curricula and textbooks;
  - the number of teachers who benefit from pre- and in-service training;
  - the availability of appropriate pedagogical resources for teacher education/training.

Scenario 3 was chosen because of its progressiveness and realism with a hybridity of 80% face-to-face teaching and 20% distance learning.

II.2. Strategic Approaches

In order to address the challenges identified above in the theoretical framework, three strategic approaches have been chosen, namely: increasing access to digital educationto all of pupils and students; adapting the curriculum, programmes and teaching approach; and improving governance and developing partnerships.

II.2.1. Increasing Access to Digital Education

This strategic intervention approach includes a strategic objective, a performance indicator and two activities.

Strategic objective: Increase access to distance/digital education to at least 60 % of pupils and students.

Performance indicator: Percentage of pupils and students having access to digital learning.

Activities for Action 1:	Stakeholders	Outputs	Performance indicators	Sources of verification	Critical conditions and assumptions
Activity 1: Building a digital learning environment	- MINEDUB - MINESEC - MINESUP - MINEFOP - MINJEC - MINPOSTEL MINDDEVEL - RLAs - TFPs	A digital learning environment provided	- Number of education and training institutions with a digital learning environment; - Percentage of pupils and students having access to digital learning	- Ministerial annual performance reports, - Statistical yearbooks, - Field monitoring reports	**Risks**: - security crisis - health crisis - cash flow crisis - natural disasters

	- civil society organisations - private partners			- images of the developed digital environment	
Activity 2: Mobilisation of communities, administrations, education and training institutions, RLAs for digital education	- MINEDUB - MINESEC - MINESUP - MINEFOP - MINJEC - MINPOSTEL MINDDEVEL - MINCOM - RLAs - TFPs - civil society organisations - private partners	Open days organised; Stakeholders sensitised and mobilised; Awareness campaigns organised; Radio and television broadcasts; Articles published in newspapers …	- Number of open days organised - Number and type of actors sensitised and mobilised to promote digital learning - Number of awareness campaigns organised - Number of radio and television broadcasts organised; - Number of articles published in newspapers	Activity reports with attendance sheets and photographs	**Risks**: - security crisis - health crisis - cash flow crisis - natural disasters - Weak intersectorality

II.2.2 Adapting the Curriculum, Programmes and the Teaching Approach

This strategic intervention approach includes a strategic objective, a performance indicator and six activities.

Strategic objective: Adapting teaching-learning processes and assessment to develop 21st century skills.

Performance indicator: Percentage of curricula, programmes and teaching approach adapted.

Action 2 Activities	Stakeholders	Deliverables	Performance Indicators	Verification Sources	Critical Conditions and Hypotheses
1. Adaptation of national education programmes and curricula and training guidelines to the to 21st century skills	MINEDUB MINESEC MINESUP MINJEC MINEFOP RLAs TFPs CSOs Steering Committee	National education programmes and training guidelines adapted to 21st century skills	Number of national education programmes and training guidelines adapted to the skills of the 21st century and implemented by sub-sector	• Annual performance report for each sector • Follow-up/Evaluation report • Programme adaptation deliverables from providers • Validation reports of	**Risks**: • Failure to take all targets into account, • Scarcity of required expertise, • Health and security crises, • Insufficient funding, • Cash flow tension, • Delay in programming activities, • Challenges in life skills and team spirit (collaboration, respect for self and others, communication, etc.) in team work • Lack of respect for Andragogical principles and training techniques

				the various programmes	• Lack of knowledge of learning styles and multiple intelligences. **<u>Mitigation measures</u>:** • Census of the main actors; • Implementation of a proactive crisis management contingency plan;
2. Adapting the digital learning environment to the needs of people with disabilities.	MINEDUB MINESEC MINESUP MINJEC MINEFOP RLAs TFPs CSOs Steering Committee	the digital learning environment is adapted to the needs of people with disabilities	Number schools with a digital learning environment adapted to the needs of people with disabilities	• Annual performance report for each sector • Follow-up/Evaluation report	**<u>Risks</u>**: • Failure to take all targets into account • Scarcity of required expertise • Health and security crises • Lack of knowledge in project planning and management • Insufficient funding • Cash flow tension • Delay in programming activities

				• Elaborators' workshop reports, etc.	• Inappropriate identification of main actors • Challenges in life skills and teamwork • Collaboration self-respect, communication, etc.) in team work • Lack of respect for Andragogical principles and training techniques • Lack of knowledge of learning styles and multiple intelligences • Digital illiteracy **Mitigation measures**: • Census of the target population and the main actors; • Training of pedagogical actors in inclusion and digitalization;

					• Implementation of a proactive crisis management contingency plan; • Insertion of management and planning courses in the training of the actors of the pedagogy
3. Producing, Editing and broadcasting MOOCs	MINEDUB MINESEC MINESUP MINJEC MINEFOP RLAs TFPs CSOs Steering Committee	MOOCs are produced, edited and broadcasted.	Number Moocs broadcasted	• Annual performance report for each sector • Follow-up/Evaluation report • Elaborators' workshop reports, etc.	**Risks**: • Failure to take all targets into account • Delay in programming activities • Inappropriate identification of main actors • Lack of respect for Andragogical principles and training techniques • Lack of knowledge of learning styles and multiple intelligences

					• Digital illiteracy **<u>Mitigation measures</u>**: • Census of the target population and the main actors; • Training of pedagogical actors in inclusion and digitalization;
4. Training of administrative, pedagogical and educational supervisors of teachers and trainers of people	MINEDUB MINESEC MINESUP MINJEC MINEFOP RLAs TFPs CSOs Steering Committee	The administrative, pedagogical, andragogical officials and supervisors are trained	Number of administrative, pedagogical, andragogical officials and supervisors trained	• Annual performance report for each sector • Follow-up/Evaluation report • Attendance lists of capacity building/	**<u>Risks</u>**: • Failure to take all targets into account • Scarcity of required expertise • Insufficient funding • Cash flow tension • Delay in programming activities • Inappropriate identification of main actors • Challenges in life skills and teamwork

				developmen t workshops, etc.	• (Collaboration self-respect, communication, etc.) in team work • Lack of respect for Andragogical principles and training techniques **Mitigation measures**: • Census of the target population and the main actors.
5. Use of ICT-related educational technologies in teaching, learning and training activities	MINEDUB MINESEC MINESUP MINPROFF MINEFOP MINJEC MINAS MINEPAT MINDDEV EL MINPOSTEL	Teaching, learning and training activities using ICT	Number of teaching, learning and training activities using ICT	• Annual performance report for each sector • Follow-up/Evaluatio n report	**Risks**: • Failure to take all targets into account • Scarcity of required expertise • Low level of telephone network coverage • Low internet penetration • Weakness of the energy equation • High cost and scarcity of

	RLAs TFPs Private actors			• Remediation report • Digital Cameroon Strategic Plan	equipment, devices and applications • Delay in programming activities • Inappropriate identification of main actors • Lack of respect for Andragogical principles and training techniques • Digital illiteracy **Mitigation measures**: • Census of the target population and the main actors; • Training of pedagogical actors in inclusion and digitalization; • Implementation of a proactive crisis management contingency plan;

II.2.3 IMPROVING GOVERNANCE AND DEVELOPING PARTNERSHIPS

This last strategic axis of intervention includes a strategic objective, a performance indicator and seven activities.

Strategic goal: Improve the implementation of the National Policy on the Development of Skill for the Digital Economy

Performance Indicator: Achievement rate of activities related to the development of skills for the digital economy

Activities	Stakeholders	Deliverables	Performance indicators	References	Risks and mitigation measures
1- **Seeking partnerships for digital education**	- **MINEDUB** **-MINEPAT** **-MINESUP** **-MINPROFF** **-MINDDEVEL** **-MINJEC** **-MINESEC** **-MINEFOP** **- MINRESI** **-RLAs** **- TFPs** **-CSOs** **-Private partners**	-Partnership agreements - Conventions - Memoranda - pleas	- Number of partnership agreements, conventions, memoranda concluded to promote digital education; - Number of pleas performed.	Sector Analysis Reports; Sectoral archives/chronicles;	**Risks: -** Pandemics and other global crises; - Weakness in intersectorality **Mitigation measures**: - Implementation of a proactive crisis management contingency plan; - Strengthening the local partnership; - Strengthening government solidarity.

2- Mobilization of financial and material resources for digital education	MINEFOP MINJEC MINAS MINEPAT MINDDEVEL MINPOSTEL RLAs TFPs Private actors	- Financial resources mobilized - Material resources mobilized	- Percentage of public budget devoted to digital education - Amount of external funding (FINEX) - Value of material resources mobilized	- Annual report on the performance of the sectors - NASF Report on FINEX - COPIL Periodic Evaluation Report	Risks: - Pandemics and other global crises; - Weakness in intersectorality. Mitigation measures: - Implementation of a proactive crisis management contingency plan; - Strengthening local partnerships; - Strengthening government solidarity - the fluctuating dollar.
3- **Coordination, monitoring and evaluation of policy activities**	**Steering Committee**	- Monitoring and Evaluation Plan for the NPDDE - Steering Committee Sessions - Follow-up and evaluation missions	- Completion rate of the follow-up and evaluation plan, - Number of Steering Committee sessions	- Steering Committee Session Reports - Follow-up and evaluation mission reports	**Risks:** - Delay in setting up the COPIL; - The non-budgeting of the Committee's activities; - Weakness in intersectorality - Currency fluctuations. **Mitigation measures:** - Accelerate the setting up of the COPIL; - Taking into account the cost of COPIL activities in budgeting; - Strengthening government cohesion.

4- Studies and statistical productions	- INS - BUCREP - MINEDUB -MINEPAT -MINESUP -MINPROFF -MINDDEVEL -MINJEC -MINESEC -MINEFOP -RLAs -TFPs -CSOs -Private partners	- Studies on digital education - digital Education Databases	- Number of studies carried out on digital education - Number of available databases - Number of variables recorded	- Study reports - Statistical yearbooks - Analysis reports - Updated SIGE	**Risks:** - limited human, financial and material resources; - Weakness in intersectorality; - Low use of online data collection. **Mitigation measures:** - Develop human, financial and material resources; - Strengthening government cohesion; - Migrating to online data collection;
5- Improvement of the normative, legal and institutional framework for digital education	-MINEPAT -MINESUP -MINPROFF -MINDDEVEL -MINJEC -MINESEC -MINEFOP -RLAs	Improved legal and institutional normative framework	- Number of texts developed or revised in support of digital education; - Number of texts in support of popularized education.	- Reports of the legal units of the sectors -COPIL Periodic Evaluation Report	- Strengthen governmental cohesion.

	-TFPs -CSOs -Private partners				
6- Research and development of pedagogical and andragogical resources in digital education	-MINRESI MINEPAT -MINESUP -MINJEC -MINEDUB -MINESEC -MINEFOP -RLAs -TFPs -CSOs -Private partners	Research activities performed in the development of educational resources in digital education.	• Number of research studies in the development of educational resources in digital education; • Number of educational resources developed and used	• Annual report on the performance of each sector • Follow-up/Evaluation report Reports of the research carried out	• Failure to take all targets into account • Scarcity of required expertise • Health and security crises • Delayed programming of activities • Inappropriate identification of key actors • Lack of respect for Andragogical principles and training techniques • Lack of knowledge of learning styles and multiple intelligences • Digital illiteracy **<u>Mitigation measures</u>**: • Census of the target population and the main actors; • Training of pedagogical actors in inclusion and digitalization. •

7- Improvement of staff working conditions	-MINEPAT -MINESUP -MINJEC -MINESEC -MINEFOP -RLAs -TFPs -CSOs -Private partners	Incentive measures for staff	- Number of staff benefiting from incentive measures	-Annual reports on the performance of sectors; - COPIL Periodic Evaluation Report.	**Risks:** - Absence of budget allocations for teachers' incentives. **Mitigation measures**: - Take teachers' incentives in the Mid-Term Expenditure Framework
8- Human Resources Development	-MINEPAT -MINESUP -MINJEC -MINESEC -MINEFOP -RLAs -TFPs -CSOs -Private partners	- Staff capacities	- Number of staff with capacities in digital education	Annual reports on the performance of sectors;	**Risks:** - Insufficient funding; - Non-budgeting of capacity building activities **Mitigation measures**: - Taking into account the budget allocated to the continuous training of staff.

Part 3: Operational Framework for Implementation

III -1. Costs of Actions and Financing Plan

ACTION 1: IMPROVING ACCESS TO DIGITAL EDUCATION (Total cost in CFA Francs)

Strategic focus of the NDS30: Pillar 2 (development of human capital and well-being)

Strategic goal: Increase access to distance/digital education to at least 60 % of pupils and students.

Target: Increase the number of pupils and students benefiting from digital education and training to at least 60 %

Performance indicators:

- Number of education and training institutions with a digital learning environment;
- Percentage of pupils and students having access to digital learning;
- Number of open days organised;
- Number and type of actors sensitised and mobilised to promote digital learning;
- Number of awareness campaigns organised;
- Number of radio and television broadcasts organised;
- Number of articles published in newspapers.
- Proportion of people with disabilities and/or vulnerabilities benefiting from digital education.

Summary of the strategy of the action:

- Activity 1: Building a digital learning environment (Total cost in CFA Francs);
- Activity 2: Mobilising communities, administrations, education and training institutions, RLAs for digital education (Total cost in CFA Francs).

Activities - sub-activities		Quantity over the 5 years	Unit cost (Thousands of CFA francs)	Overall cost (Thousands of CFA francs)	Officials	Sources of funding	Period				
							2024	2025	2026	2027	2028
ACTION 1: IMPROVING ACCESS TO DIGITAL EDUCATION (Total cost in CFA Francs)											
Activity 1: Building a digital learning environment (Total cost in CFA Francs)											
A11											
A12											
Activity 2: Mobilisation of communities, administrations, education and training institutions, RLAs for digital education (Total cost in CFA Francs).											
A21											
A22											

ACTION 2: Adapting the curriculum, programmes and the teaching approach (Total cost in CFA Francs)

Strategic focus in the SND30: Pillar 2 (human capital and well-being development)

Strategic goal: Adapting the curriculum, programmes, the teaching approach and assessment to develop 21st century skills

Target: Increasing the participation rate to at least 60 % of people pupils and students in digital teaching-learning processes, training and assessments by 2028.

Performance indicators:

- Number of national education programmes and training guidelines adapted to the 21st century skills and implemented by sub-sector;
- Number of continuous assessment and certification materials adapted and in force;
- Number Moocs broadcasted;
- Number of administrative, pedagogical, andragogical officials and supervisors trained;
- Number of teaching, learning and training activities using ICT.

Summary of the action strategy (Total cost in CFA Francs)

1. Adaptation of national education programmes and curricula and training guidelines to the 21st century skills (Total cost in CFA Francs)
2. Adapting the digital learning environment to the needs of people with disabilities (Total cost in CFA Francs)
3. producing, Editing, and broadcasting MOOCs (Total cost in CFA Francs)
4. Training of administrative, pedagogical and educational supervisors of teachers and trainers of people (Total cost in CFA Francs)
5. Use of ICT-related educational technologies in teaching, learning and training activities (Total cost in CFA Francs)

Activities /sub-activities	Amount over the 5 years	Unit cost (Thousands of FCFA)	Total cost (Thousands of FCFA)	Persons in charge	Funding sources	Period

							2023	2024	2025	2026	2027
Action 2: Use of ICT-related educational technologies in teaching, learning and training activities (Total cost in CFA Francs)											
A21	**Adaptation of national education programmes and curricula and training guidelines to the to 21st century skills (Total cost in CFA Francs)**										
A211											
A212											
A22	**Adapting the digital learning environment to the needs of people with disabilities (Total cost in CFA Francs)**										
A221											
A222											

ACTION 3: Improve the implementation of the National Policy on Digital Education (Total cost in CFA Francs)

Strategic focus on the NDS30: Pillar 4 (governance, decentralisation and strategic management of the State).

Strategic objective: Optimise the implementation of the National digital Education Policy.

Target: At least 80% of the activities of the National Digital Education Policy will be implemented by 2028.

Performance indicators:

- Number of partnerships agreements for the promotion of digital education formalised;
- Amount of financial and material resources mobilised for digital education;
- Number of monitoring and assessment missions carried out;
- Available data collection system on digital education;
- Number of statistical studies on digital education conducted;
- Number of new texts on digital education signed;
- Number of staff trained to provide pedagogical, andragogical and didactic resources for digital education.

Overview of the action strategy:

- Seeking partnerships for digital education (Total cost in CFA Francs);
- Mobilising financial and material resources for digital education (Total cost in CFA Francs);
- Coordination, monitoring and evaluation (Total cost in CFA Francs);
- Research and statistical production (Total cost in CFA Francs);
- Researching and developing pedagogical and andragogical resources for digital education (Total cost in CFA Francs);
- Developing Human Resources (Total cost in CFA Francs).

Activities-sub-activities		Quantity over 5 years	Unit cost (Thousands of CFA francs)	Total cost (Thousands of CFA francs)	Managers	Sources of funding	Period				
							2024	2025	2026	2027	2028
Action 3: GOVERNANCE AND DEVELOPMENT OF PARTNERSHIPS											
A31	**Seeking partnerships for digital education (Total cost in CFA Francs)**										
A311											
A312											
A32	**Mobilising financial and material resources for digital education (Total cost in CFA Francs)**										
A321											

III.2. FINANCING PLAN FOR THE NATIONAL POLICY ON DIGITAL EDUCATION

Activities	Period	QUANTITY	UNIT COST			TOTAL COST			
			Sectorial	TFP	Private partner and CSOs	Sectorial	TFP	Private partner and CSOs	Total Cost per year
IMPROVING ACCESS TO DISTANCE EDUCATION									
Activity 1: Implementation of measures to promote digital education									
A111. Development of a digital environment in schools	2023	1							
	Total A11	**1**							

III.2. Implementation and Monitoring/Evaluation Plan of the National Policy for Distance Education

The effective implementation of the priority actions provided for in this policy requires an institutional mechanism for steering and coordination, as well as the empowerment of stakeholders.

III.2.1. Institutional Framework for Steering and Coordinating Implementation

The choice of the institutional framework for steering and coordinating the National Digital Education Policy is based on political and technical stakes.

At the political level, it will involve the highest authorities at the strategic level, including the heads of the relevant sectoral ministerial departments within the framework of a Steering and Coordination Committee.

At the technical level, coordination will be carried out at the central level of the said departments, through an Implementation and Monitoring Committee.

National Steering and Coordination Committee

The Steering and Coordination Committee is the body responsible for the overall coordination, guidance and evaluation of policy. It is responsible for the validation of the annual and three-year action plans of key stakeholders, the evaluation of the policy implementation and the validation of its financing plan.

Chaired by the Prime Minister, Head of Government, it is made up of heads of ministerial departments concerned with the implementation of digital education in Cameroon. It is created by an order of the Prime Minister, Head of Government, on the proposal of the Minister of Secondary Education and meets at the end of each semester.

It is assisted by an implementation and monitoring committee.

III.2.1.2. IMPLEMENTATION AND FOLLOW-UP COMMITTEE

The Implementation and Monitoring Committee (CMOS) is created by an order of the Prime Minister, Head of Government, on the proposal of the Minister of Secondary Education. It is the technical body responsible for monitoring the implementation process of this policy. Chaired by the Minister of Secondary Education, it is made up of the Secretaries-general of the concerned sectoral ministries and meets at the end of each semester. It is assisted by a technical secretariat.

III.2.1.3. TECHNICAL SECRETARIAT

The Technical Secretariat is responsible for:

- Ensuring the implementation of the directives of the monitoring committee;
- Organising meetings and visits of the Monitoring Committee;
- Preparing meeting reports;

- Coordinating field activities and prepare annual activity reports.

It is chaired by the Coordinator of the Distance Learning Centre of the Ministry of Secondary Education and composed of the directors of the other sectoral ministries concerned with digital education. It meets at the end of every term. Regional focal points may participate as appropriate.

III.2.1.4. Regional Focal Points

Each sectoral ministry concerned shall appoint a regional monitoring focal point who shall report to its representative on the Implementation and Monitoring Committee. They are responsible for monitoring activities at the regional level and for preparing reports for their ministerial hierarchy at the end of each term.

III 2.2. Responsibilities of Stakeholders

The implementation, monitoring and evaluation of this policy requires the various stakeholders to be held accountable.

III.2.2.1. Concerned Sector Ministries

Each ministerial department concerned with digital education shall:

- include the activities listed in the National Digital Education Policy Document in its Medium-Term Expenditure Framework for annual budgeting;

- implement budgeted activities, monitor and evaluate them;

- appoint its representatives to all bodies set out by this policy document;

- participate in meetings to coordinate and steer the implementation of the policy;

- active search of funding from international partners for the implementation of this policy. especially their support in the following specific areas:

- Purchase or donation of essential teaching and learning materials;

- Continuous education workshops in sign language and Braille;

- Construction, redevelopment of classrooms/workshops, physical environments of education and training institutions and equipping with educational resources;

- Production of digital materials, various printed materials and other educational resources.

III.2.2.2. Local and Regional Authorities (Regional Councils and Municipalities)

In accordance with Law No. 2019/024 of December 24, 2019 on the General Code of Local Authorities, due to the powers and resources that have been transferred to them in terms of education, literacy, and technical and vocational training, the Local authorities (RLAs) are important partners in the financing and implementation of digital education. As such, municipal and regional development plans and budgets must address issues related to this policy.

The RLAs must therefore monitor the implementation and periodically evaluate the activities selected within the framework of their budgets through the focal points at municipal and regional level.

III.2.2.3. International Development Partners

International partners involved in the development of digital education in Cameroon shall:

- Provide financial and technical support to the Government of Cameroon for the implementation of the national policy on digital education;
- Support Educational Research Centres for Digital Education.

III.2.2.4. National Development Partners

National partners include Non-Governmental Organisations (NGOs), Civil Society Organisations (CSOs) and faith-based or religious organisations. These organisations have general and specific networks that they use to mobilise resources for social and educational purposes.

As such, they shall support the Government in the construction of facilities, equipment and community mobilisation. They shall take part in all monitoring and evaluation activities planned within their sphere of competence. They should forward their annual action plans and activity reports to the regional focal points.

Conclusion

In a nutshell, this project aims at developing a national policy document on the development of skills for the digital economy. The project will enable the Cameroonian Government ensure that at least a proportion of 60 % of pupils and students receive an equitable, digital and quality digital education by 2028.

6.1.2. Proposals for programmes and curricula

- **To curriculum and programmes developers:**

The results of this study have confirmed the absence of a skill-responsive curriculum. In that token, we discovered in the course of our research that there is already a partnership agreement between Cameroon government and the International Bureau of Education of UNESCO to transform the curricula at all levels of education within the ministries in charge of education and training. The works are carried out by the international consultant Millet and six components have been developed to address the issue.

We therefore propose to the representatives of the Ministry of Secondary Education engaged in the process of restructuring the curriculum of the entire schooling system to:

- ✓ Revise teachers' pre and in-service training programmes in a bid to equip them with the necesary competences to help secondary school students develop skills for the digital economy;
- ✓ Integrate business incubation into the current entrepreneurship education for greater effectiveness. These business incubators shall provide access to relevant resources which can serve as conversion factors along the journey towards entrepreneurial functioning;
- ✓ Develop a context-dependent list of skills required for entrepreneurial success of secondary school students;
- ✓ Develop skills "sequentially" in order to reach a digital end goal. More advanced skills are built on more basic skills;
- ✓ Develop some skills "simultaneously". A secondary school student may need a wide range of skills of different levels of difficulty at the same time in order to achieve a single digital end goal. For instance, searching for an online housing list required basic keyboarding skills, knowledge of web browsing, an e-mail account, familiarity with password management, some knowledge of data privacy, creating an e-mail account and the ability to fill in forms on a webpage. Each of these skills entails both advanced and basic competencies. A novice computer user immediately needs to employ these skills simultaneously.

6.1.3. Proposals for Governance/Policy Implementation

- **To the Education and Training Sectoral ministers**

The results of this study have confirmed the absence of a policy implementation plan. In Part 3 the above-proposed National Policy Document on the Development of Skills for the Digital Economy, we have elaborated an Operational Framework for Implementation that encompasses the costs of actions, a financing plan and an implementation and monitoring-evaluation plan.

6.1.4. Proposals for infrastructure and equipment

- **To the Education and Training Sectoral administrations, the Regional and Local Authorities, the Financial and Technical Partners and the Private sector**

The findings of this study have confirmed the weak provision of infrastructure and equipment. In Part 1 the above-proposed National Policy Document for Digital Economy, we have elaborated a development plan for digital education by sub-sector from 2024 to 2028 that forecasts the number of targeted regional studios for digital education, the number of digital tools to be acquired, the number of computers and ICT devices to be acquired for students, the number of computers and ICT devices to be acquired for teachers, the internet broadband speed to be supplied to schools, the number of targeted teachers/lectures to be trained per cycle, the number of targeted supervisors to be trained, and the number of targeted pupils/learners per cycle.

6.1.5. Proposals for Teaching Methods

The findings of this study have confirmed the use of diverse teaching approaches. We therefore propose the use of a "blended learning" approach, a mixture of traditional face-to-face classroom learning and e-learning. Both may be based on a competence-based approach.

6.2. Areas for Future Research

This research titled "The Education System and the Development of Skills for the digital economy: A Case Study of Secondary School Graduates in Cameroon" focused on policy design, curricula/programmes, governance/policy implementation, infrastructure and equipment and teaching methods. For further research, the following dimensions are recommended:

- The same work can be carried out on another education sub-sector like Basic Education, Higher Education or Vocational Training;

- A comparative and contrastive study can be carried out between government and private secondary schools;
- Another study can aim at distance evaluation methods (prognostic, formative and summative);
- Research can also be conducted on the use of other distance learning tools like radio, television or micro clouds.

GENERAL CONCLUSION

The development of skills for the digital economy or 21st century skills has been an uphill task in Cameroon's educational system in particular and sub-Saharan countries at large. Many researchers have observed that the slow rate of integration of online learning in African education systems has been hindered by too much belief and attachment to the traditional face-to-face model (Djeumeni-Tchamabe, 2007). Therefore, it is of utmost importance to revamp the education system with well-designed policies, adapted programmes and curricula, a good governance/implementation plan, an adapted environment (infrastructure and equipment) and reviewed teaching methods. Such a revolution should be carried out by all stakeholders of the education sector at the macro, meso, exo, chrono, onto and micro levels of the system.

The hypotheses of this study were discussed and analysed through quantitative and qualitative findings (questionnaire, interview and participant observation) and backed up by authors findings and views. The main objective of this study was to determine the extent to which the education system influences the development of skills for the digital economy amongst secondary school students in Cameroon. The variables studied were policy design, curricula/programmes, governance/policy implementation, infrastructure and equipment and teaching methods. Eight hundred and sixty-five (865) undergraduate students were surveyed with a Likert-scaled questionnaire, eight officials of central and devolved services were interviewed and a participant observation was carried out.

The findings confirmed that policy design, curricula/programmes, governance/policy implementation, infrastructure and equipment and teaching methods significantly correlate with the development of skills for the digital economy. These results are in accordance with the findings from questionnaires, interviews and the observation.

In terms of proposals, an amended copy of the law no. 98/004 of 14th April 1998 to lay down guidelines on education in Cameroon has been elaborated. In the same vein, a national policy document on the development of skills for the digital economy has been developed in direction to stakeholders of the Education and Training Sector. These pertinent innovations coupled with concrete infrastrutural, curricular and methodological inputs shall give more impetus to the development of skills for the digital economy in Cameroon Secondary Education in particular and the whole education system at large, and shall obviously contribute to meet the targets of National Development Strategy 2020 - 2030 and those of the Sustainable Development Goal no.4.

REFERENCES

Ackoff, R. L., and Emery, F. E. (2017). On purposeful systems. New York, NY: Routledge.

Aduwa-Ogiegbaen, S. E., and Iyamu, E.O.S. (2005). Using Information and Communication Technology in Secondary Schools in Nigeria: Problems and Prospects. *Educational Technology and Society, 8(1), 104-112*

Akerlof, G. A. (2005). *Explorations in pragmatic economics*. Oxford University Press.

Akyol, Z., and Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology*, *42*(2), 233-250.

Al-Khouri, A.M. (2012). Emerging Markets and Digital Economy: Building Trust in the Virtual World. *International Journal of Innovation in the Digital Economy 3, 2, 57-69.*

Alonso, F., López, G., Manrique, D., and Viñes, J. M. (2005). An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of educational technology*, *36*(2), 217-235.

Amin, M. E. (2005). *Social Science Research: Conception, Methodology and Analysis*. Kampala: Makerere University Printery.

Amombi, D.A. (2023). *Educational Policy Planning of ICT Programme and its Effect on Students' Professional Development in Teacher Training Colleges in Cameroon*. Unpublished doctoral dissertation, University of Yaoundé 1, Yaoundé, Cameroon.

Anderson, J. E. (2010). Public policy making-An introduction (7th ed.). Boston MA: Wadsworth.

Anderson, J. R. (1996). ACT: A simple theory of complex cognition. *American psychologist*, *51*(4), 355.

Anderson, T., Garrison, D. R., Archer, W., and Rourke, L. (2000). Methodological issues in the content analysis of computer conference transcripts.

Anderson, J., and Rainie, L. (2018). Artificial intelligence and the future of humans. Washington, DC: Pew Research Center Retrieved from https://www.pewresearch.org/internet/2018/12/10/artificialintelligence-and-the-future-of-humans/.Africa Union Commission. (2017). Agenda2063-The Africa We Want.

https://d1wqtxts1xzle7.cloudfront.net/38983501/APP_REPORT_2015_FINAL_low1. Accessed 13/08/2021.

Arkorful, V., and Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. International Journal of Instructional Technology and Distance Learning, 12(1), 29-42

Atsa E. et al (2017). *Development of the Digital Economy in Cameroon: Challenges and Perspectives*. The Electronic Journal of Information Systems in Developing Countries.

Bahri-Domon, Y. (2015). Business in Cameroon, Stratline Limited, http://www.businessincameroon.com/pdf/BC29.pdf

Ball S. (2012). Global Education Inc. New Policy Networks and the Neoliberal Imaginary. London: Routledge

Banchi, H., and Bell, R. (2008). The many levels of inquiry. *Science and children*, *46*(2), 26.

Béché, E. and Fonkoua, P. (2016). Introduction: Utility, usability and acceptability of open and distance learning in Cameroonian university context. Paris: L'Harmattan (p. 11-32).

Béché, E. (2013b). TIC et innovations dans les pratiques enseignantes au Cameroun. Frantice.net, vol 6, 5-21.

Béché, E. (2019). Conceptualizing the Implementation of Distance Learning System at the Higher Teacher's Training College of Maroua (Cameroon).

Béché, E. (2020). Cameroonian responses to COVID-19 in the education sector: Exposing an inadequate education system. *International Review of Education, 66* (5), 755-775.

Béché, E., and Schneider, D. K. (2019). État des lieux de la recherche francophone sur les formations ouvertes et à distance. *Distances et médiations des savoirs. Distance and Mediation of Knowledge*, (27).

Bennis W. (2013). Leadership in a Digital World: Embracing Transparency and Adaptive Capacity. MIS Q37:635–636

Berman, S. J. (2012). Digital Transformation: Opportunities to Create New Business Models. *Strategy and Leadership*.

Bers, M. U., Flannery, L., Kazakoff, E. R., and Sullivan, A. (2014). Computational Thinking and Tinkering: Exploration of an Early Childhood Robotics Curriculum. Computers and Education, 72, 145-157

Best, J., and Dunlap, A. (2012). Beyond Access: Effective Digital Learning for a Globalized World. *Mid-continent Research for Education and Learning (McREL)*.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., and Venkatraman, N. V. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS quarterly*, 471-482.

Birmingham, P., and Wilkinson, D. (2003). *Using Research Instruments: A guide for Researchers*. Routledge.

Bonk, C. J., and Graham, C. R. (2012). *The handbook of blended learning: Global perspectives, local designs*. John Wiley and Sons.

Borup, J. (2016). Teacher Perceptions of Learner-Learner Engagement at a Cyber Secondary School. *International Review of Research in Open and Distributed Learning*, *17* (3), 231-250.

Borup, J., Chambers, C. B., and Stimson, R. (2019). K-12 Student Perceptions of Online Teacher and On-Site Facilitator Support in Supplemental Online Courses. *Online Learning*, *23* (4), 253-280.

Borup, J., Graham, C. R., and Drysdale, J. S. (2014). The nature of Teacher Engagement at an Online Secondary School. *British Journal of Educational Technology*, *45* (5), 793-806.

Bottino, R. M. (2014). ICT as a Catalyst of Innovation in *ICT in Education in Global Context*. Springer, Berlin, Heidelberg (pp. 3-18)

Brandon, S. E. (2016). *Defining, Developing and Retaining Competencies for the 21st Century-an Evaluation of an Organization Development Programme to Support Retention and its Application to Institutions of Higher Education* (Doctoral dissertation, University of Pittsburgh).

Brice R. Mbodiam**.** (2021). https://www.businessinCameroon.com/public-management/1806-11691-Cameroon-the-low-number-of-new-civil-servants-to-be-recruited-this-year-is-due-to-the-socio-economic-environment-minfopra-le-says**.** Retrieved on 23/09/2021.

Briney, A. (2007). Green Revolution. *History and Overview of Green Revolution http://www.about. Com*.

Brooks-Harris, J.E., and Stock-Ward, S.R. (1999). Workshops: Designing and facilitating experiential learning. Thousand Oaks, CA: Sage.

Brown, S., and Sessions, J. G. (1999). Education and employment status: a test of the strong screening hypothesis in Italy. *Economics of education Review*, *18*(4), 397-404.

Bukht, Rumana and Heeks, Richard, (2017). Defining, Conceptualising and Measuring the Digital Economy Development Informatics Working Paper no. 68

Callaway A. (1971). *Educational Planning and Unemployed Youths*. Paris, UNESCO: International Institute of Educational Planning.

Cassidy, L., Warner, M., Caspary, K., Joshi, E., and Yee, K. (2021). Lessons Learned from the Engage New England Initiative.

Cha, K. J., Hwang, T., and Gregor, S. (2015). An integrative model of IT-enabled organizational transformation: A multiple case study. *Management Decision*.

Chang, V., Gütl, C., and Ebner, M. (2018). Trends and opportunities in online learning, MOOCs, and cloud-based tools. *Second handbook of information technology in primary and secondary education*, 935-953.

Check, J., and Schutt, R. K. (2012). Teacher research and action research. *Research methods in education*, 255-271.Yin, R. K. (1994). Discovering the future of the case study. Method in evaluation research. *Evaluation practice*, *15* (3), 283-290.

Chen, G., Shen, J., Barth-Cohen, L., Jiang, S., Huang, X., and Eltoukhy, M. (2017). Assessing elementary students' computational thinking in everyday reasoning and robotics programming. Computers and Education, 109, 162-175.

Chireshe, R. (2006). The Job-Hunting Process. In J. Mapfumo and R. Chireshe (Eds). Career Guidance for job seekers. Gweru, Mambo Press, pp. 29-50

Chevalier, J. (2004). What Do We Know About Cross-subsidization? Evidence from Merging Firms. *Advances in Economic Analysis and Policy*, *4*(1), 1218.

Cleveland-Innes, M., and Campbell, P. (2012). Emotional presence, learning, and the online learning environment. *The International Review of Research in Open and Distributed Learning*, *13*(4), 269-292.

Cloete, N., and Mouton, J. (2015). *Doctoral education in South Africa*. African Minds. https://www0.sun.ac.za/crest/wp-content/uploads/2021/04/Doctoral-Education-in-South-Africa-WEB.pdf. Accessed, 15/05/2021.

Collins online dictionary (2021) (https://www.collinsdictionary.com. Retrieved on 12/03/2021

Connelly, B. L., Certo, S. T., Ireland, R. D., and Reutzel, C. R. (2011). Signalling theory: A review and assessment. *Journal of management*, *37*(1), 39-67.

Creswell, J. W. (2003). A framework for design. *Research design: Qualitative, quantitative, and mixed methods approaches*, 9-11.

Creswell, J. W., and Garrett, A. L. (2008). The "movement" of mixed methods research and the role of educators. *South African journal of education*, vol *28* (3), 321-333.

Creswell, J. W., and Miller, D. L. (2000). Determining validity in Qualitative Inquiry. *Theory into practice*, 39 (3), 124-130.

Culp, K. M., Honey, M., and Mandinach, E. (2005). A retrospective on twenty years of education technology policy. *Journal of Educational Computing Research*, *32*(3), 279-307.

Daniel, E. M., and Wilson, H. N. (2003). *The role of dynamic capabilities in e-business transformation*. European Journal of Information Systems, 12(4), 282-296.

Debret, J. (2020). *Les normaes APA françaises : Guide officiel de Scribbr basé sur la septième édition (2019) des normes APA*. Scribbr.

Dhawan, S. (2020). *Online learning: A panacea in the time of COVID-19 Crisis*. Journal of Educational Technology Systems, 49(1): 5–22.

Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, *49* (1), 5-22.

Di Maio, F., Rem, P. C., Baldé, K., and Polder, M. (2017). Measuring resource efficiency and circular economy: A market value approach. *Resources, Conservation and Recycling*, *122*, 163-171.

Djeumeni-Tchamabe, M. (2007). Les écoles normales et les établissements scolaires face aux TICE : le cas du Cameroun. http://www.adjectif.net/spip/spip.php?article29. Retrieved on August 21, 2021.

Djeumeni-Tchamabe, M. (2010). *Pratiques pédagogiques des enseignants avec les TIC au Cameroun entre politiques publiques et dispositifs techno-pédagogiques, compétences des enseignants et compétences des apprenants, pratiques publiques et pratiques privées* (Doctoral dissertation, Paris 5).

Doh, B. T. S. (2011). Corporate Management for Higher Education: An Application of the Balanced Scorecard. https://www.researchgate.net/profile/Bilola-Sdoh/publication/269694706_Corporate_Management_for_Higher_Education_An_Application_of_the_Balanced_Scorecard. Accessed on 26 March, 2022.

Downes, S. (2008). Places to go: Connectivism and connective knowledge. *Innovate: Journal of Online Education*, *5*(1), 6.

Draft Document of the Sector wide Approach/ Education. (2001). MINEDUB - MINESEC - MINEFOP – MINESUP.

Dremel, C., Wulf, J., Herterich, M. M., Waizmann, J. C., and Brenner, W. (2017). How AUDI AG established big data analytics in its digital transformation. *MIS Quarterly Executive*, *16*(2).

Duggan, S. B. (2019). Examining 'digital disruption' as problem and purpose in Australian education policy. *International Education Journal: Comparative Perspectives*, *18* (1), 111-127.

Edokat, T. (2000). *Effect of Brain Drain on Higher Education in Cameroon.* In S. Tapsoba, et al., (eds.), *Brain drain and capacity-building in Africa*. Dakar: Senegal, ECA/IDRC/IOM.

El Sawy, O. A., Kræmmergaard, P., Amsinck, H., and Vinther, A. L. (2020). How LEGO built the foundations and enterprise capabilities for digital leadership. In *Strategic Information Management* (pp. 174-201). Routledge.

Elisha, M. (2006). The application of information and communication technology (ICT) in Nigerian academic libraries: Prospects and problems. The Information Manager, 6 (1), 35-39.

Ellis, R. K. (2009). Learning Management Systems. *Alexandria, VI: American Society for Training and Development (ASTD).*

http://cit.eservices.gov.za/dhetnols/sites/default/files/2020-02/LMS_fieldguide_20091_4.pdf. Accessed on 10/12/2020.

Engozo'o, Y. R., Fozing I., and Mutia R. (2023). Critical Issues in Developing Skills for the Digital Economy: The State of Policy in the Ministry of Secondary Education in Cameroon. American Journal of Educational Research, vol. 11, no. 6: 372-380.

Erdenebaatar, A., Zolboo, D., and Baigaltugs, S. (2011). Comparison of the learning management systems. In *International Conference EICHTE-2011, Ulaanbaatar, Mongolia* (Vol. 1, p. 2011).

Ermeling, B. A. (2012). Improving teaching through continuous learning: The inquiry process John Wooden used to become coach of the century. Quest, 64(3), 197-208.

ESSP. (2006). La stratégie sectorielle de l'éducation- Education Sector Strategic Plan. (April 2006). Available online at http://planipolis.iiep. unesco.org/upload /Cameroon/Cameroon_sectorstrategy.pdf

European Centre of Independent Certification in E-Learning (2021). *Teaching Online during COVID-19. Resources for TVET teachers and Trainers. https://ecicel.org/*. Accessed on 23/06/2021.

European Commission. (2021). The Digital Education Action Plan (2021-2027). https://education.ec.europa.eu/focus-topics/digital-education/digital-education-action-plan. Retrieved on 05/06/2021.

Evens, T. (2010). Value networks and changing business models for the digital television industry. *Journal of media business studies*, *7*(4), 41-58.

Eyestone, R. (1971). *The threads of public policy: A study in policy leadership*. Ardent Media. https://books.Google.cm/books?hl=enandlr=andid=1kVGxI715uwCandoi=fndandpg=PA2anddq=Robert+EyeStone+terms+public+policy+as+%22the+relationship+of+government+unit+to+its+environment.+Tandots=gLcUDfVTmzandsig=QXhSTzuMmOVQKpzsdGjwRd-RiYsandredir_esc=y#v=onepageandqandf=false. Retrieved on 01/06/2021.

E. Muh and F. Tabet. (2017). Sustainable Energy Policies in Cameroon: a holistic overview, Renew. Sustain. Energy Rev. 82, 0–10 [Google Scholar].

Fadel, C., and Trilling, B. (2010). 21st Century Skills: Learning for Life in Our Times. *Education Review*.

Farrell, G., Isaacs, S., Hamdy, A., Hare, H., Tchinda, J. T., Mangesi, K., ... and Fall, B. (2007). Survey of ICT in Education in Africa, 53 Country Report: Volume 2. http://oasis.col.org. retrieved on 15/07/2021.

Farrell, G., Isaacs, S., Hamdy, A., Hare, H., Tchinda, J. T., Mangesi, K., ... and Fall, B. (2007). Survey of ICT in Education in Africa, 53 Country Report: Volume 2. http://oasis.col.org/bitstream/handle/11599/248/SurveyICTEducationAfrica_Volume2.pdf?sequence=1. Accessed, 15/12/2020.

Florida Virtual Campus. (2018). Student Textbook and Course Materials Survey: Executive Summary, 2018. Accessed June 15, 2021.

Fonkeng, G. E. (2007). *The History of Education in Cameroon, 1884-2004.* Newyork: Edwin Maclean press.

Fonkoua, P. (2006a). Approche conceptuelle de la « ticelogie » ou science d'intégration des TIC dans la formation des formateurs. Dans P. Fonkoua (dir.), Intégration des TIC dans le processus enseignement-apprentissage au Cameroun (p. 223- 234). Yaoundé, Cameroun : Éditions terroirs, collection ROCARE-Cameroun.

Fonkoua, P. (2009). Les TIC pour les enseignants d'aujourd'hui et de demain. In T. Karsenti (dir.). Intégration pédagogique des TIC en Afrique : Stratégies d'action et pistes de réflexion (p.151- 181). Ottawa : CRDI.https://en.unesco.org/covid19/educationresponse/solutions. Retrieved on August 22, 2021.

Fozing, I. (2010). Marché du travail en période d'ajustement structurel: quelques résultats d'analyse du comportement des demandeurs d'emplois au Cameroun. Revue de l'Association Francophone Internationale de Recherche Scientifique en Education, Nº3, pp. 66-84.

Frick, T. W. (1991). Restructuring education through technology. Bloomington, IN: Phi Delta Kappa Education Foundation. Retrieved from https://tedfrick.sitehost.iu.edu/fastback/fastback326.html

Frick, T. W. (1997). Artificially intelligent tutoring systems: What computers can and can't know. Journal of Educational Computing Research, 16(2), 107–124 Retrieved from https://tedfrick.sitehost.iu.edu/epistemology/aitutor.pdf.

Frick, T. W. (2019). Importance of educology for improving education systems. In J. M. Spector, B. B. Lockee, and M. D. Childress (Eds.), Learning, Design, and Technology: An International Compendium of Theory, Research, Practice and Policy: Systems thinking and change (E. G. Kowch, Vol. ed.). Cham: Springer Nature Switzerland AG. https://doi.org/10.1007/978-3-319-17727-4_92-1.

Frick, T.W. Education Systems and Technology in 1990, 2020, and Beyond. TechTrends 64, 693–703 (2020). https://doi.org/10.1007/s11528-020-00527-y

Friedman, E., and Lee, C. K. (2010). Remaking the world of Chinese labour: A 30-year retrospective. British journal of industrial relations, 48 (3), 507-533.

Friesen, N. (2009). *Re-thinking e-learning research: Foundations, methods, and practices* (Vol. 333). Peter Lang. https://auspace.athabascau.ca/bitstream/handle/2149/2439/Introduction%20to%20E-Learning.pdf?sequence=3. Accessed on 20/15/202.

Gaillard, J., Zink, E., and Furo Tullberg, A. (2003). Scientific research capacity in Cameroon: an assessment of IFS support. https://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers12-05/010051446.pdf. Accessed, 12/12/2020.

Garrison, D. R., and Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley and Sons.

GESP (2009). Growth and Employment Strategy Paper (GESP) for 2010-2020, Cameroon: Government of Cameroon.

Gibson, E. J. (1988). Exploratory behaviour in the development of perceiving, acting, and the acquiring of knowledge. *Annual review of psychology*, *39* (1), 1-42.

Gonzalez-Videgaray, M. C. (2007). Assessment of Student and Teacher's Reaction in a Blended Learning Model for Higher Education. *Relieve-Revista Electrónica de Investigación y Evaluación Educativa*, *13* (1), 83-103.

Granier, F. (2010). Bernadette Charlier, France Henri, Apprendre avec les technologies. *Lectures*.

Grindle, M. S. (2004). Good enough governance: poverty reduction and reform in developing countries. *Governance*, *17* (4), 525-548.

Grover, V., and Kohli, R. (2013). Revealing your hand: Caveats in implementing digital business strategy. *Mis Quarterly*, 655-662.

Grover, V., and Kohli, R. (2013). Revealing your hand: Caveats in implementing digital business strategy. *Mis Quarterly*, 655-662.

Günther, W. A., Mehrizi, M. H. R., Huysman, M., and Feldberg, F. (2017). Debating big data: A literature review on realizing value from big data. *The Journal of Strategic Information Systems*, *26* (3), 191-209.

Guri-Rosenblit, S. (2005). 'Distance education'and 'e-learning': Not the same thing. *Higher education*, *49* (4), 467-493.

Guri-Rosenblit, S. (2005). 'Distance education' and 'e-learning': Not the same thing. *Higher education*, *49* (4), 467-493.

Hafkin, N. (2002). Are ICTs gender-neutral? A gender analysis of six case studies of multi-donor ICT projects.

Hannon, J., and Macken, C. (2014). Blended and online curriculum design toolkit. La Trobe University.

Henri, F., and Charlier, B. (2015). *Apprendre avec les technologies*. Presses Universitaires de France.

Hess T, Matt C, Benlian A, Wiesböck F. (2016) Options for formulating a digital transformation strategy. MIS Q Exec 15 (2):123–139

Hess, T., Matt, C., Benlian, A., and Wiesböck, F. (2020). Options for formulating a digital transformation strategy. In *Strategic Information Management* (pp. 151-173). Routledge.

Howlett, M., and Cashore, B. (2014). Conceptualizing public policy. In *Comparative policy studies* (pp. 17-33). Palgrave Macmillan, London. Retrieved from http://ndl.ethernet.edu.et/bitstream/123456789/52643/1/183.pdf#page=30. 06/01/2021.

Howlett, M., and Cashore, B. (2014). Conceptualizing public policy. In *Comparative policy studies* (pp. 17-33). Palgrave Macmillan, London.

Huang, H. M. (2002). Toward constructivism for adult learners in online learning environments. *British journal of educational technology*, *33*(1), 27-37.

Hubackova, S., and Klimova, B. F. (2013). Pedagogical aspects of eLearning. Language on-line course and issues of learning styles. *Procedia-Social and Behavioural Sciences*, *93*, 1095-1098.

Hubackova, S., and Klimova, B. F. (2014). Integration of ICT in lifelong education. *Procedia-Social and Behavioural Sciences*, *116*, 3593-3597. www.sciencedirct.com.

I.M.F. (2006). Cameroon: poverty reduction strategy paper third annual progress report

IMF (2003). Cameroon: Poverty Reduction Strategy Paper. Country Report No. N°.03/249, August 2003. Washington D.C: IMF.

International Society for Technology Education (ISTE). (2006). ISTE Computational Thinking Competences. https://www.iste.org/iste-standards. Accessed 23/09/2021.

Isaacs, S. (2015). A Baseline Study on Technology-Enabled Learning in the African and Mediterranean Countries of the Commonwealth: Report.

Jamieson-Proctor, R., and Finger, G. (2008). Act to improve ICT use for learning: A synthesis of studies of teacher confidence in using ICT in two Queensland schooling systems. Australian Educational Computing, 23(2), 12-18.

Jones, D. A., Willness, C. R., and Madey, S. (2014). Why are job seekers attracted by corporate social performance? Experimental and field tests of three signal-based mechanisms. *Academy of Management Journal*, *57*(2), 383-404.

Josué, T. T. (2007). ICT in Education in Cameroon. *Cameroon country report produced by Survey of ICT and Education in Africa*, available at: www.infodev.org/infodev-files/resource/InfodevDocuments_390. pdf.

Kahiigi, E. K., Vesisenaho, F. F., Hansson, H., Danielson, M., and Tusubira, M. (2012). Modelling a Peer Assignment Review Process for Collaborative E-learning. Journal of Interactive Online Learning, 11(2), 67–79

Karsenti, T. (2004). Pourquoi une revue scientifique internationale portant sur l'intégration des TIC en pédagogie universitaire ? *Revue internationale des technologies en pédagogie universitaire*, *1*(1"), 7–8.

Karsenti, T. (2009). *Intégration pédagogique des TIC : Stratégies d'action et pistes de réflexion*. Ottawa: CRDI.

Karsenti, T., Collin, S., and Harper-Merrett, T. (2011). *Pedagogical integration of ICT: Successes and challenges from 100+ African Schools* Ottawa, ON: IDRC. Retrieved from https://depot.erudit.org/id/003775dd?mode=fullandlocale=fr, on March 03, 2021.

Kate, B. (2022). Learning management systems.

https://www.techtarget.com/searchcio/definition/learning-management system**. Accessed on 12/03/2022.**

K Toure, TM Tchombé, T Karsenti (2008). ICT and Chaging Mindsets in Education.Langaa Research and Publishing Common Initiative Group, Bamenda, Cameroon.

Kaoga K. et al (2021). Status of renewable energy in Cameroon. Maroua

Keen, P., and Williams, R. (2013). Value architectures for digital business: beyond the business model. *Mis Quarterly*, *37*(2), 643-647.

Khan, A. R. (2016). Policy implementation: Some aspects and issues. *Journal of Community Positive Practices*, (3), 3-12.

Kipsoi, E. J., Chang'ach, J. K., and Sang, H. C. (2012). Challenges facing adoption of information communication technology (ICT) in educational management in schools in Kenya. Journal of Sociological Research, 3(1), 18-28

Kirschner, P., Sweller, J., and Clark, R. E. (2006). Why unguided learning does not work: An analysis of the failure of discovery learning, problem-based learning, experiential learning and inquiry-based learning. *Educational Psychologist*, *41*(2), 75-86.

Klein-Collins, R., and Wertheim, J. B. (2013). Growing importance of prior learning assessment in the degree-completion toolkit. *New Directions for Adult and Continuing Education*, *2013*(140), 51-60.

Kolb, D. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice-Hall.

Kolb, A. Y., and Kolb, D. A. (2009). Experiential Learning Theory: A dynamic, holistic approach to management learning, education and development. *The SAGE handbook of management learning, education and development*, *42*, 68.

Kozma, R. (2005). National policies that connect ICT-based education reform to economic and social development. Human Technology, 1(2), 117-156.

Lackéus, M. (2015). Entrepreneurship in education: What, why, when, how. *Background Paper*.

Lai, E. R., and Viering, M. (2012). Assessing 21st Century Skills: Integrating Research Findings. *Pearson*. https://eric.ed.gov/?id=ED577778. Retrieved on 25/02/2022.

Law No. 005 of 16 April 2001 on the Orientation of Higher Education. Available online at http://www.spm.gov.cm/fr/documentation/textes-legislatifs-et-reglementaires/article/loi-n-005-du-16-avril-2001-portant-orientation-de-lenseignemant-superieur.html

Lasica, I.E., Meletiou-Mavrotheris, M., Katzis, K., Dimopoulos, C. and Mavrotheris E. (2018). Designing a Teacher Training Program on the Integration of Augmented and mixed Reality Tecnologies within the Educational Process. In the *12th Annual International Technology, Education and Development Conference*. Valencia, Spain.

Lee, T., and Lee, J. (2006). Quality assurance of web-based e-learning for statistical education. In *Compstat 2006-Proceedings in Computational Statistics* (pp. 429-438). Physica-Verlag HD.

Li, L., Su, F., Zhang, W., and Mao, J. Y. (2018). Digital transformation by SME entrepreneurs: A capability perspective. *Information Systems Journal*, *28*(6), 1129-1157.

Liao, H. L., and Lu, H. P. (2008). The role of experience and innovation characteristics in the adoption and continued use of e-learning websites. *Computers and Education*, *51*(4), 1405-1416.

Literat, I., Kligler-Vilenchik, N., Brough, M., and Blum-Ross, A. (2018). Analyzing youth digital participation: Aims, actors, contexts and intensities. *The Information Society*, *34*(4), 261-273.

Llopis, J., Gonzalez, M. R., and Gasco, J. L. (2004). Transforming the firm for the digital era: An organizational effort towards an E-culture. *Human Systems Management*, *23*(4), 213-225.

Loebbecke, C., and Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, *24*(3), 149-157.

Maslak, M. A. (Ed.). (2008). *The structure and agency of women's education*. SUNY Press.

Means, B., Toyama, Y., Murphy, R., Bakia, M., and Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies.

Miettinen, R. (2000). The concept of experiential learning and John Dewey's theory of reflective thought and action. International Journal of Lifelong Education, 19(1), 54-72.

Mishra, P. and Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. The Teachers College Record,108(6), 1017-1054.

Mossberger, K., Tolbert, C. J., and Stansbury, M. (2003). *Virtual inequality: Beyond the digital divide*. Georgetown University Press.

Mukhtarov, F. (2014). Rethinking the travel of ideas: Policy translation in the water sector. *Policy and Politics*, *42*(1), 71-88.

N°.06/260, July 2003. IMF, Washington DC.

Mutia, R. (2013). Dropouts in Cameroonian Schools: Causes and Consequences. Asian Women Vol.29 No.2 , University of Yaoundé 1, Yaoundé, Cameroon.

Mwangi S. Kimenyi and Nelipher Moyo (2011). Leapfrogging development Through Technology Adoption. Foresight Africa: The continent's Greatest Challenges and Opportunities for 2011, The Brookings Institution https://www.brookings.edu/wpcontent/uploads/2016/06/01_africa_economy_agi_kimenyi_moyo.pdf

Nadkarni, S., and Prügl, R. (2021). Digital transformation: a review, synthesis and opportunities for future research. *Management Review Quarterly*, *71*(2), 233-341.

Nadkarni, S., and Prügl, R. (2021). Digital transformation: a review, synthesis and opportunities for future research. *Management Review Quarterly*, *71*(2), 233-341.

Nage-Sibande, B., and Morolong, B. L. (2018). A trend analysis of opportunities and challenges of open and distance learning provision in dual-mode institutions. *Distance Education*, *39*(4), 495-510.

Ndenge, K. (2013). Analysing Cameroon government's ICT policy documents and trainee teachers' perception of ICT in education policy implementation using critical discourse analysis. http://oasis.col.org/bitstream/handle/11599/1984/2013. Accesed on 25/03/2021.

Ndongfack, M. (2015) Mastery of Active and Shared Learning Processes for Techno-Pedagogy (MASLEPT): A Model for Teacher Professional Development on Technology Integration. *Creative Education*, 6: 32–45.

Ndongmo, K. (2021). Cameroon Digital Rights Landscape Report. *Digital Rights in Closing Civic Space: Lessons from Ten African Countries*. https://www.ictworks.org/wp-content/uploads/2021/09/Digital_Rights_in_Closing_Civic_Space_Lessons_from_Ten_African_Countries.pdf#page=229. Accessed on 23/5/2021.

Ng, I. C., and Wakenshaw, S. Y. (2017). The Internet-of-Things: Review and research directions. *International Journal of Research in Marketing*, *34*(1), 3-21.

NGU, S. W., and Teneng, P. P. (2020). Unlocking Graduates' Employability: The Case of Technical Secondary school Graduates of the Diamaré Division, Far North Region, Cameroon. *American Journal of Educational Research*, *8*(9), 705-717.

Ngwana, T. (2003). University strategic planning in Cameroon: what lessons for sub-Saharan Africa?. *Education Policy Analysis Archive*. http://eprints.lincoln.ac.uk/1831/1/EPAA_Article.pdf. Accesed on 05/06/2021.

Njebakal, S. E., and Teneng, P. P. (2017). Technological Inputs in Higher Education and Graduate Destinations in Cameroon. The Case of the University of Yaoundé I. *International Journal of New Technology and Research*, *3*(3), 25-29.

Njeuma, L. D., et al., (1999). *Reforming a National System of Higher Education: The Case of Cameroon. A Report of the ADEA Working Group on Higher Education*. Retrieved from www.adeanet.org/pubadea/publications/pdf/he_Cameroon on the 10/19/2020.

Nkamta, E. (2017). Skills Acquisition in Cameroon: How well does the secondary school curriculum Equip school leavers for employment? *International Journal of Humanities and Social* Sciences Vol. 9, No. 5, 2017, pp. 7-24,

Oh, K., Kho, H., Choi, Y., and Lee, S. (2022). Determinants for Successful Digital Transformation. *Sustainability*, *14*(3), 1215.

Oppenheim, C. (2002). Do we need fresh thinking on national information policy? . *Alexandria*, *14*(1), 1-2.

Peña, P. A. (2020). Relative age and investment in human capital. *Economics of Education Review*, *78*, 102039.

Philips, M. (2016). Re-contextualising TPACK: Exploring Teachers (non) Use of Digital Technologies. *Technology, Pedagogy and Education*, 41(5), 706- 720

Psacharopoulos, G., and Patrinos, H. (2002). Returns to Investment in Education: *A Further Update*. World Bank Policy Research Working Paper, No. 2881. Washington D.C.

Rodgers, C. R., and Raider-Roth, M. B. (2006). Presence in teaching. *Teachers and Teaching: theory and practice*, *12*(3), 265-287.

Rogers, C. R. (1969). Freedom to learn: A view of what education might become. Merrill.

Rose, R. (1991). What is lesson-drawing? Journal of public policy, 3-30. Retrieved from https://www.jstor.org/stable/4007336?seq=1. On 01/06/2021.

Rynes, S. L., Bretz Jr, R. D., and Gerhart, B. (1991). The importance of recruitment in job choice: A different way of looking. Personnel psychology, 44(3), 487-521.

Safari, H., Moslehi, A., Mohammadian, A., Farazmand, E., Haki, K., and Khoshsima, G. (2004). EGovernment Maturity Model (EGMM). In *ICEIS (4)* (pp. 471-474).

Saint, W. S. (1999). Tertiary distance education and technology in Sub-Saharan Africa. Washington, DC: World Bank.

Sebastian, I. M., Ross, J. W., Beath, C., Mocker, M., Moloney, K. G., and Fonstad, N. O. (2020). How big old companies navigate digital transformation. In Strategic information management (pp. 133-150). Routledge.

Shariff, S., and Hoff, D. L. (2016). Cyber bullying: Clarifying legal boundaries for school supervision in cyberspace.

Shepherd, H. G. (1998). The probe method: A problem-based learning model's effect on critical thinking skills of fourth- and fifth-grade social studies students. Dissertation Abstracts International, Section A: Humanities and Social Sciences, 59(3-A).

Shepherd, N. G. (1998). The Probe Method: A problem-based learning model's affect on critical thinking skills of fourth and fifth grade social studies students. North Carolina State University.

Sia, S. K., Soh, C., and Weill, P. (2016). How DBS Bank Pursued a Digital Business Strategy. *MIS Quarterly Executive*, *15*(2).

Siemens, G. (2007). Connectivism: Creating a learning ecology in distributed environments. *Didactics of microlearning. Concepts, discourses and examples*, 53-68.

Simon, C. A. (2010). Public policy: Preferences and outcomes [2nd edt]. New York: Pearson Educations.

Singh, V., and Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education*, *33*(4), 289-306.

Skinner, B. F. (1968). Teaching Science in Secondary school—What Is Wrong? Scientists have not brought the methods of science to bear on the improvement of instruction. *Science*, *159*(3816), 704-710.

Stamoulis, D., Gouscos, D., Georgiadis, P., and Martakos, D. (2001). Revisiting public information management for effective e-government services. *Information Management and Computer Security*.

Stenbom, S., Hrastinski, S., and Cleveland-Innes, M. (2016). Emotional presence in a relationship of inquiry: The case of one-to-one online math coaching. *Online Learning*, *20*(1), 41-56.

Stewart, J. J., Hedge, D. M., and Lester, J. P. (2008). Public policy: An evolutionary approach (3rd ed.). Boston: Thomsom Wordsworth.

Tafah, E. O. (1998). *Rates of Returns to Education*. A Case of Cameroon.

Tambo, L. (2003). *Principles and Methods of Teaching: Applications in Cameroon Schools.* Buea: Anucam Publishers.

Tamukong, J. (2007). Analysis of information and communication technology policies in Africa. *PanAf Edu Newsletter*, *1*(1), 4. http://citeseerx.ist.psu.edu. retrieved on 15/07/2021.

Tanyi, M.E. (2009). *Major theories of learning: the processes of why, how and when we learn.* Yaoundé: Africana publications.

Tchombe, T. M., Toure K. & Karsenti T. (2016). *ICT and Changing Mindset in Education*. Langaa Research and Publishing.

Tchombe, T. M. (2017). *Analysis of Inclusive Education in Cameroon.* Final Report, Submitted to the Ministry of Basic Education. Yaounde: Ministry of Basic Education.

Teneng, P. P. (2016). Skills Oriented Higher Education and Graduate Employability in Cameroon: The Case of the National Employment Fund. *International Journal of New Technology and Research (IJNTR)*, *2*(5), 26-29. https://sflan.com/download/IJNTR_Volume2_Issue5/IJNTR02050012.pdf. Accessed on February 23, 2021.

Teneng, P. P. (2020). Transformational Leadership and Wealth Creation in Educational Organizations: The Case of Higher Education in Cameroon. *Global Journal of Transformative Education*, *2*(1), 99-113.

Tetang Tchinda, J. (2007). ICT in Education in Cameroon. infoDev. *World Bank*.

Tumbas, S., Berente, N., and vom Brocke, J. (2020). Three types of chief digital officers and the reasons organizations adopt the role. In *Strategic Information Management* (pp. 292-308). Routledge.

Turban, D. B., Dougherty, T. W., and Lee, F. K. (2002). Gender, race, and perceived similarity effects in developmental relationships: The moderating role of relationship duration. *Journal of vocational behaviour*, *61*(2), 240-262.

UNCTAD Annual Report. (2019). https://unctad.org/annualreport/2019/Pages/index.html. Accessed on 10/07/2021.

UNESCO(2021). 2021, UNESCO held a conference on "OER policies: A Global perspective on what works". https://www.unesco.org/en/communication-information/open-solutions/open-educational-resources. Accessed on 25/04/2022.

UNESCO. (2016). Education 2030: Incheon Declaration and Framework for Action for the Implementation of Sustainable Development Goal 4. ED-2016/WS/28. Paris: UNESCO. Retrieved from http://unesdoc.unesco.org/Ulis/cgi-bin/ulis.pl? catno = 245656.

UNESCO-UNEVOC, (2015). World TVET Database Cameroon. www.unevoc.unesco.org. Accessed: 04/10/2017.

UNESCO-UNEVOC. (2013). *Advancing TVET for Youth Employability and Sustainable Development:* Abuja.

UNICEF. (2002). *Quality Education For All: From a Girl"s Point of View*. New York: UNICEF.

United Nations Educational, Scientific, and Cultural Organization (UNESCO). (2016). Education 2030: Incheon Declaration and Framework for Action for the Implementation of Sustainable Development Goal 4: Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning. *UNESCO Digital Library*.

United Nations Millennium Development Goals. (2000).Newyork. www.un.org/millenniumgoals. Accessed 04/06/2021.

United Nations Millennium Development Goals. (2000).Newyork. www.un.org/millenniumgoals. Accessed 04/06/2021.

Update, O. O. (2017). Organization for Economic Cooperation and Development (OECD), 2017.

Van Meter, D. S., and Van Horn, C. E. (1975). The policy implementation process: A conceptual framework. *Administration and Society*, *6*(4), 445-488.

Vey, K., Fandel-Meyer, T., Zipp, J. S., and Schneider, C. (2017). Learning and Development in Times of Digital Transformation: Facilitating a Culture of Change and Innovation. *International Journal of Advanced Corporate Learning*, *10*(1).

Viennet, R., and Pont, B. (2017). Education policy implementation: A literature review and proposed framework.

Wallet, P. (2015). Information and Communication Technology (ICT) in Education in Sub-Saharan Africa: A comparative analysis of basic e-readiness in schools. https://unesdoc.unesco.org/ark:/48223/pf0000234279, accessed, March 25, 2022.

Wang, Y., Han, X., and Yang, J. (2015). Revisiting the blended learning literature: Using a complex adaptive systems framework. *Journal of Educational Technology and Society*, *18*(2), 380-393.

Wee, M. C., and Zaitun, A. B. (2006). Obstacles towards the use of ICT tools in teaching and learning of information systems in Malaysian universities. The International Arab Journal of Information Technology, 3(3), 203-209.

Weinberger, M. (2016). Why entrepreneurs are essential to the global economy—EY. *Financial Times, June*, *7*.

Wenger, E., McDermott, R. A., and Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Harvard business press.

Wescott, C. (2001, June). E-government: enabling Asia-Pacific governments and citizens to do public business differently. In *Proceedings of the First Asia and Pacific Forum on Poverty* (Vol. 1, pp. 108-130).

White, M. (2012). Digital workplaces: Vision and reality. *Business information review*, *29*(4), 205-214.

William and Flora Hewlett Foundation. "Open Educational Resources." Accessed June 15, 2019. https://hewlett.org/strategy/open-educational-resources/ ↵

Woolfolk, A., and Shaughnessy, M. F. (2004). An interview with Anita Woolfolk: The educational psychology of teacher efficacy. *Educational psychology review*, *16*(2), 153-176.

Word Education Forum for Action. Dakar, Senegal, April 2000.

World Bank Report. (2020). https://www.worldbank.org/en/region/afr/overview. Accessed on 10/17/2020.

World Bank. (2017). Cameroon 2017 Economic Memorandum - World Bank Group. www.wordbank.org.

World Bank. (2018). World development report 2019: The changing nature of work. The World Bank.

World Bank. (2019). Digital Economy for Cameroon Diagnostic. Report. Washington, DC: World Bank. http://pubdocs.world.org. accessed on June 20, 2021.

World Conference on Education for All: *Meeting Basic Learning Needs.* Jomtien, Thailand 5-9 March 1990.

World Economic situation and prospects. (2019). https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2019_BOOK-web.pdf. Retrieved on 10/07/2021.

Wyatt-Smith, C., Lingard, B., and Heck, E. (2019). Digital learning assessments and big data: Implications for teacher professionalism.

Yadin, A. (2011). Reducing the dropout rate in an introductory programming course. ACM inroads, 2(4), 71-76.

Yeow, A., Soh, C., and Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *The Journal of Strategic Information Systems*, *27*(1), 43-58.

Yin, R. K. (2012). Case study methods.

Yin, Robert K. "Case study research and applications: Design and methods." (2018).

Yusuf, M. O. (2005). Information and communication technology and education: Analysing the Nigerian national policy for information technology. *International education journal*, *6* (3), 316-321.

APPENDIXES

Appendix 1

QUESTIONNAIRE

Dear respondent, accept my warm greetings. My name is ENGOZO'O Yvan Rony, I am a Ph.D. student from the University of Yaounde I, Faculty of Education, Department of Educational Management. I am carrying out a Research on the topic: **"The Education System and the Development of Skills for Digital Economy among Secondary School Graduates in Cameroon".** The objective of this questionnaire is to obtain information on the state of digitalization of teaching-learning transactions in Cameroon Secondary schools, and the extent to which it mediates to the development of skills for digital economy amongst secondary school learners. Your responses are guaranteed of absolute confidentiality and discreet for the sole purpose of academic research, and nothing else.

I. Identification: Tick *(√)* the appropriate box

Q1	**Gender:** 1- Male ☐ 2- Female ☐
Q2	**Age range:** 1) 17-20 ☐ ;2) 21-23 ☐ 3) 24-27 ☐ 4) 28-30 ☐ 5) 31 and above ☐
Q3	**Academic level: Bachelor of Arts (BA)** 1) First year BA ☐ 2) Second year BA ☐
Q4	**Series:……..**
Q5	**Reason for enrolling into university:** 1) Could not pick a job after my Bachelors of Degree ☐ 2) I am following a particular career path ☐ 3) My friends motivated me to ☐ 4) I continue learning for my professional exigencies ☐
Q6	Unemployment duration since graduate ***1)*** 1-2 years ☐ ***2) 3***-4 years ☐ ***3)*** 5-6 years ☐ ***4)*** 7-8 years ☐ 5) 5) 8 years and above

***NB**: Please indicate the degree to which these statements express your view by ticking (√) the box that comes closest to your opinion about the education system and the development of skills for digital economy among secondary school graduates attending first cycle university courses in Cameroon.*

Response Key:

SA (5)	*A (4)*	*NS (3)*	*DA (2)*	*SDA (1)*
Strongly Agree	***Agree***	***Not sure***	***Disagree***	***Strongly Disagree***

II: policy design.

No.	**statements**	***SA (5)***	***A (4)***	***NS (3)***	***DA (2)***	***SDA (1)***
Q1	I'm aware of the existence of a relevant policy that supports e-learning in secondary education.					
		Comments:				
Q2	I am aware of the existence of a digital learning plan designed by the government to guide the use of technology in the classroom					
		Comments:				
Q3	The policy goals are relevant to the development of skills for digital economy					
		Comments:				
Q4	There is an existing implementation plan for e-learning at the secondary school					
		Comments:				
Q5						

	There are elements of access, equity and inclusion in digital learning policy in secondary education in Cameroon	**Comments:**				
Q6	I am convinced that this policy provides for Partnership between teaching-learning and the business world					
		Comments:				
Q7	Secondary Education policy has made provisions for opened education resources such as digital libraries, opened access journals for teachers and learners and expand access to textbooks and other forms of learning content.					
		Comments:				
Q8	Digital policy has laid down sustainability mechanisms					
		Comments:				
Q9	This policy is SMART (Specific, Measurable, Achievable, Realistic and Time-bound)					
		Comments:				

III. Programmes/curriculum design

No.	**statements**	***SA (5)***	***A (4)***	***NS (3)***	***DA (2)***	***SDA (1)***
Q1	Our course objectives targeted skills for digital economy					
		Comments:				
Q2	The course content was full of digital economy element such as medial skills, online marketing skills, digital communication, innovation and creativity, etc.					
		Comments:				

Q3	The Digital economy content is being taught as the mainstream content.					
		Comments:				
Q4	There exists a curriculum/course design for digital classrooms (online learning)					
		Comments:				
Q5	There is partnership with the labour market sector on programme/curriculum development					
		Comments:				
Q6	There exist effective partnerships between Theory Vs Practice in content delivery					
		Comments:				
Q7	The curriculum is adapted to learners with disabilities					
		Comments:				

IV. Governance / policy implementation

No.	**statements**	***SA (5)***	***A (4)***	***NS (3)***	***DA (2)***	***SDA (1)***
Q1	There exists an implementation plan.					
		Comments:				
Q2	Decision-making has been well done with regards to e-learning issues.					
		Comments:				
Q3	There is a**n** e-governance in our schools					
		Comments:				

Q4	I'm aware there is transparency and accountability in governance issues in this context					
		Comments:				
Q5	There is sustainability in finance and maintenance of digital equipment					
		Comments:				
Q6	There sufficient resource mobilisation capacity by our leaders					
		Comments:				
Q7	There are practical monitoring and evaluation mechanisms					
		Comments:				

V. Infrastructure and equipment

No.	**statements**	***SA (5)***	***A (4)***	***NS (3)***	***DA (2)***	***SDA (1)***
Q1	There were ICT tools such as computers that facilitate learning.					
		Comments:				
Q2	There exist 21st century teaching halls (smart classroom environment)					
		Comments:				
Q3	There exist updated software devices for the 21st century teaching-learning.					
		Comments:				

Q4	There exists a high-speed internet connectivity for e-learning					
		Comments:				
Q5	There exist ICT tools adapted to people with disabilities.					
		Comments:				
Q6	Do key stakeholders possess technological devices in the teaching environment					
		Comments:				
Q7	There exists a mechanism for permanent maintenance of digital infrastructure and equipment which is effectively put in place					
		Comments:				

VI. Teaching methods.

No.	**statements**	***SA (5)***	***A (4)***	***NS (3)***	***DA (2)***	***SDA (1)***
Q1	Our secondary school teachers used the Competence-based approach to teach us.					
		Comments:				
Q2	Our secondary school teachers used Project-based learning during our lessons					
		Comments:				
Q3	Our secondary school teachers used the problem-based learning in teaching us					
		Comments:				
Q4	Our secondary school teachers used the inquiry-based approach while teaching.					
		Comments:				

Q5	Our secondary school teachers used the blended learning method while teaching us.					
		Comments:				
Q6	Our secondary school teachers used the pure online method.					
		Comments:				
Q7	Our teachers demonstrated the required ICT-teaching skills.					
		Comments:				

VII. Skills for digital economy

No.	**statements**	***SA (5)***	***A (4)***	***NS (3)***	***DA (2)***	***SDA (1)***
Q1	I am convinced that secondary school students graduate with critical thinking and problem-solving skills.					
		Comments:				
Q2	I am convinced secondary school students graduate with communication skills.					
		Comments:				
Q3	I am convinced secondary school students graduate with collaboration skills					
		Comments:				
Q4	I am convinced secondary school students graduate with creativity skills					
		Comments:				
Q5						

	I am convinced secondary school students graduate with analytical skills	**Comments:**
Q6	I am convinced secondary school students graduate with computer programming skills.	**Comments:**
Q7	I am convinced secondary school students graduate with software development skills.	**Comments:**
Q8	I am convinced secondary school students graduate with digital security and privacy skills.	**Comments:**
Q9	I am convinced secondary school students graduate with data management skills.	**Comments:**
Q10	I am convinced secondary school students graduate with data analysis skills.	**Comments**
Q11	I am convinced secondary school students graduate with data communication skills	**Comments:**
Q12	I am convinced secondary school students graduate with digital design skills	**Comments:**
Q13	I am convinced secondary school students graduate with project management skills	**Comments:**
Q14	I am convinced secondary school students graduate with business processing skills	**Comments:**

Thank you for your collaboration.

Appendix 2

Interview with officials of the Ministry of Secondary Education responsible for e-learning.

Dear respondent, accept my warm greetings. My name is ENGOZO'O Yvan Rony, I am a Ph.D. student from the University of Yaounde I, Faculty of Education, Department of Educational Management. I am carrying out a Research work on the topic: **"The Education System and the Development of Skills for Digital Economy: A Case Study of Secondary School Graduates in Cameroon".** The objective of this interview guide is to obtain information on the state of digitalization of teaching-learning in the secondary school cycle in Cameroon, and the extent to which it mediates to the development of skills for digital economy among secondary school learners. Your responses are guaranteed of absolute confidentiality and discreet for the sole purpose of academic research, and nothing else.

Provide your opinion on the following questions as deeper as you can.

Background information.

- Gender……
- Age……
- Current position at the ministry……
- Longevity in service……

1. Can you edify us about the existence of a comprehensive policy framework for e-leaning in your ministry?

2. Can you comment on the state of implementing this policy, if it really exists? What about e-governance?

3. What is your opinion about the relevance of the curriculum content in relation to developing digital economy skills?

4. What is the state of digital teaching-learning infrastructure and equipment?

5. What can you say about teachers' ICT pedagogic skills in the designing and delivery of courses with new technologies? Comment on the teaching methods used by these teachers.

Thanks for your keen attention and collaboration.

Appendix 3

Observation checklist for the Distance Learning Centre of MINESEC

My name is ENGOZO'O Yvan Rony, I am a PhD student from the University of Yaounde I, Faculty of Education, Department of Educational Management. I am carrying out a Research work on the topic: **"The Education System and the Development of Skills for Digital Economy: A Case Study of Secondary School Graduates in Cameroon".** The objective of this observation checklist is to obtain information on the state of digitalization of teaching-learning by this centre, and the extent to which it mediates to the development of skills for digital economy on secondary school learners. The information observed from the centre is guaranteed of absolute confidentiality and discreet for the sole purpose of academic research, and nothing else.

Item observed	Appreciation		Observations/description
	Sufficient	Insufficient	
Policy design/ reform/ decision creating this centre: relevance and considerations.			
Implementation plan: effectiveness/efficiency			

Programs: relevance of content to digital economy skills			
Equipment: availability of updated computers, smart screens, video recording system or equipment, online lesson delivery systems			
E-learning software: MOOCs, Moodle, etc.			

APPENDIX 4: TABLES OF CRITICAL VALUES

Appendix *F*: Critical Values of the *F* Distribution

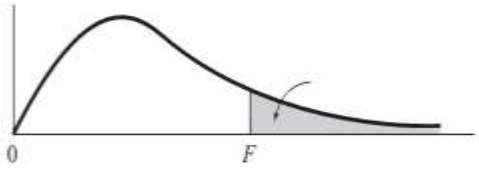
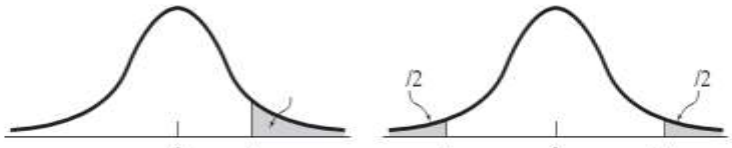


Table 1 $\alpha = 0.05$

Degrees of Freedom for Denominator	Degrees of Freedom for Numerator															
	1	2	3	4	5	6	7	8	9	10	15	20	25	30	40	50
1	161.4	199.5	215.8	224.8	230.0	233.8	236.5	238.6	240.1	242.1	245.2	248.4	248.9	250.5	250.8	252.6
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.43	19.44	19.46	19.47	19.48	19.48
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.70	8.66	8.63	8.62	8.59	8.58
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.86	5.80	5.77	5.75	5.72	5.70
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.62	4.56	4.52	4.50	4.46	4.44
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	3.94	3.87	3.83	3.81	3.77	3.75
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.51	3.44	3.40	3.38	3.34	3.32
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.22	3.15	3.11	3.08	3.04	3.02
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.01	2.94	2.89	2.86	2.83	2.80
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.85	2.77	2.73	2.70	2.66	2.64
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.72	2.65	2.60	2.57	2.53	2.51
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.62	2.54	2.50	2.47	2.43	2.40
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.53	2.46	2.41	2.38	2.34	2.31
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.46	2.39	2.34	2.31	2.27	2.24
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.40	2.33	2.28	2.25	2.20	2.18
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.35	2.28	2.23	2.19	2.15	2.12
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.31	2.23	2.18	2.15	2.10	2.08
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.27	2.19	2.14	2.11	2.06	2.04
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.23	2.16	2.11	2.07	2.03	2.00
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.20	2.12	2.07	2.04	1.99	1.97
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.15	2.07	2.02	1.98	1.94	1.91
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.11	2.03	1.97	1.94	1.89	1.86
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.07	1.99	1.94	1.90	1.85	1.82
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.04	1.96	1.91	1.87	1.82	1.79
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.01	1.93	1.88	1.84	1.79	1.76
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	1.92	1.84	1.78	1.74	1.69	1.66
50	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.03	1.87	1.78	1.73	1.69	1.63	1.60
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.84	1.75	1.69	1.65	1.59	1.56
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.75	1.66	1.60	1.55	1.50	1.46
200	3.89	3.04	2.65	2.42	2.26	2.14	2.06	1.98	1.93	1.88	1.72	1.62	1.56	1.52	1.46	1.41
500	3.86	3.01	2.62	2.39	2.23	2.12	2.03	1.96	1.90	1.85	1.69	1.59	1.53	1.48	1.42	1.38
1000	3.85	3.01	2.61	2.38	2.22	2.11	2.02	1.95	1.89	1.84	1.68	1.58	1.52	1.47	1.41	1.36

Source: The entries in this table were computed by the author.

Appendix *t*: Percentage Points of the *t* Distribution



One-tailed test Two-tailed test

	Level of Significance for One-Tailed Test								
	0.25	*0.20*	*0.15*	*0.10*	*0.05*	*0.025*	*0.01*	*0.005*	*0.0005*
	Level of Significance for Two-Tailed Test								
df	*0.50*	*0.40*	*0.30*	*0.20*	*0.10*	*0.05*	*0.02*	*0.01*	*0.001*
1	1.000	1.376	1.963	3.078	6.314	12.706	31.821	63.657	636.620
2	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	31.599
3	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	12.924
4	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	6.869
6	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	5.408
8	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	5.041
9	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.781
10	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.587
11	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	4.318
13	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	4.140
15	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	4.073
16	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	4.015
17	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.965
18	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.883
20	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.850
21	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.819
22	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.792
23	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.768
24	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.745
25	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.725
26	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.690
28	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.659
30	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.646
40	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.551
50	0.679	0.849	1.047	1.299	1.676	2.009	2.403	2.678	3.496
100	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.390
∞	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.291

Source: The entries in this table were computed by the author.

Table V

Loi du r de Bravais-Pearson (Probabilités bilatérales)

ddl \ Seuil	0.20	0.10	0.05	0.02	0.01	0.001	0.0001	0.00001
1	0.9512	0.9878	0.9971	0.9997	1.0000	1.0000	1.0000	1.0000
2	0.8002	0.9002	0.9502	0.9802	0.9902	0.9992	1.0000	1.0000
3	0.6872	0.8055	0.8785	0.9345	0.9589	0.9913	0.9982	0.9997
4	0.6085	0.7294	0.8116	0.8822	0.9173	0.9742	0.9920	0.9976
5	0.5510	0.6696	0.7546	0.8310	0.8747	0.9510	0.9807	0.9924
6	0.5069	0.6216	0.7069	0.7889	0.8345	0.9251	0.9657	0.9842
7	0.4717	0.5824	0.6665	0.7499	0.7978	0.8984	0.9482	0.9734
8	0.4429	0.5495	0.6320	0.7156	0.7647	0.8723	0.9295	0.9608
9	0.4188	0.5216	0.6022	0.6852	0.7349	0.8472	0.9104	0.9470
10	0.3982	0.4974	0.5761	0.6582	0.7080	0.8235	0.8913	0.9324
11	0.3804	0.4763	0.5531	0.6340	0.6837	0.8011	0.8726	0.9176
12	0.3647	0.4577	0.5326	0.6122	0.6615	0.7801	0.8545	0.9027
13	0.3508	0.4410	0.5141	0.5924	0.6413	0.7605	0.8370	0.8879
14	0.3384	0.4261	0.4975	0.5744	0.6227	0.7421	0.8203	0.8734
15	0.3273	0.4125	0.4823	0.5579	0.6057	0.7248	0.8043	0.8593
16	0.3171	0.4002	0.4684	0.5427	0.5899	0.7086	0.7890	0.8455
17	0.3079	0.3889	0.4557	0.5287	0.5752	0.6933	0.7744	0.8322
18	0.2994	0.3785	0.4439	0.5157	0.5616	0.6789	0.7604	0.8193
19	0.2915	0.3689	0.4330	0.5035	0.5489	0.6654	0.7471	0.8068
20	0.2843	0.3600	0.4229	0.4922	0.5369	0.6525	0.7344	0.7948
21	0.2776	0.3517	0.4134	0.4817	0.5258	0.6404	0.7223	0.7832
22	0.2713	0.3439	0.4045	0.4717	0.5153	0.6289	0.7107	0.7720
23	0.2654	0.3367	0.3962	0.4624	0.5053	0.6179	0.6996	0.7612
24	0.2599	0.3299	0.3884	0.4536	0.4960	0.6075	0.6889	0.7508
25	0.2547	0.3234	0.3810	0.4452	0.4871	0.5976	0.6787	0.7408
26	0.2499	0.3174	0.3740	0.4373	0.4787	0.5881	0.6689	0.7311
27	0.2453	0.3116	0.3674	0.4298	0.4707	0.5791	0.6596	0.7217
28	0.2409	0.3062	0.3612	0.4227	0.4630	0.5705	0.6505	0.7127
29	0.2368	0.3010	0.3552	0.4159	0.4558	0.5622	0.6418	0.7040
30	0.2328	0.2961	0.3495	0.4095	0.4488	0.5543	0.6335	0.6955
31	0.2291	0.2915	0.3441	0.4033	0.4422	0.5467	0.6254	0.6874
32	0.2255	0.2870	0.3389	0.3974	0.4359	0.5394	0.6177	0.6795
33	0.2221	0.2827	0.3340	0.3917	0.4298	0.5323	0.6102	0.6718
34	0.2189	0.2787	0.3293	0.3863	0.4240	0.5256	0.6029	0.6644
35	0.2157	0.2748	0.3247	0.3811	0.4184	0.5190	0.5960	0.6572
36	0.2128	0.2710	0.3204	0.3761	0.4130	0.5128	0.5892	0.6502
37	0.2099	0.2674	0.3162	0.3713	0.4078	0.5067	0.5827	0.6435
38	0.2071	0.2640	0.3122	0.3667	0.4028	0.5009	0.5763	0.6369
39	0.2045	0.2606	0.3083	0.3622	0.3980	0.4952	0.5702	0.6306
40	0.2019	0.2574	0.3045	0.3579	0.3913	0.4897	0.5642	0.6244
50	0.1808	0.2308	0.2734	0.3219	0.3543	0.4434	0.5134	0.5708
60	0.1651	0.2110	0.2502	0.2950	0.3250	0.4080	0.4740	0.5289
70	0.1530	0.1955	0.2320	0.2738	0.3019	0.3799	0.4425	0.4949
80	0.1431	0.1831	0.2173	0.2567	0.2831	0.3570	0.4165	0.4666
90	0.1350	0.1727	0.2051	0.2424	0.2674	0.3377	0.3946	0.4427
100	0.1281	0.1639	0.1948	0.2302	0.2541	0.3212	0.3758	0.4221
200	0.0907	0.1162	0.1382	0.1637	0.1810	0.2300	0.2705	0.3054
300	0.0741	0.0950	0.1130	0.1340	0.1482	0.1886	0.2222	0.2513
400	0.0642	0.0823	0.0980	0.1161	0.1285	0.1637	0.1930	0.2185
500	0.0574	0.0736	0.0877	0.1040	0.1150	0.1466	0.1729	0.1959
1000	0.0407	0.0521	0.0621	0.0736	0.0815	0.1040	0.1227	0.1392

14-04-98

REPUBLIC OF CAMEROON **PEACE - WORK - FATHERLAND**

LAW N° 98/004 OF 14 AVR. 1998

TO LAY DOWN GUIDELINES FOR EDUCATION IN CAMEROON.-

The National Assembly deliberated and adopted,
The President of the Republic hereby enacts
the law set out below :

PART I
GENERAL PROVISIONS

Section 1 : (1) This law lays down the general legal framework of education in Cameroon.

(2) It shall apply to nursery, primary, secondary grammar and technical education, as well as to teacher-training.

Section 2 : (1) Education shall be a top priority of the nation.

(2) It shall be provided by the State.

(3) Private sector partners shall assist in providing education.

Section 3 : The State shall institute bilingualism at all levels of education as a factor of national unity and integration.

Section 4 : The general purpose of education shall be to train children for their intellectual, physical, civic and moral development and their smooth integration into society bearing in mind prevailing economic, socio-cultural, political and moral factors.

Section 5 : On the basis of the general purpose defined in Section 4 above, the objectives of education shall be to :

(1) train citizens who are firmly rooted in their cultures, but open to the world and respectful of the general interest and the common weal ;

(2) inculcate the major universal ethical values which are, dignity and honour, honesty and integrity as well as a sense of discipline into pupils and students ;

(3) promote family life ;

(4) promote national languages ;

(5) provide an introduction to the democratic culture and practice, respect for human rights and freedoms, justice and tolerance, the fight against all forms of discrimination, the love of peace and dialogue, civic responsibility and the promotion of regional and sub-regional integration ;

(6) cultivate the love of effort and work well done, the quest for excellence and team spirit ;

(7) develop creativity, a sense of initiative and the spirit of enterprise ;

(8) provide physical, sports, artistic and cultural training for the child ;

(9) promote hygiene and health education.

Section 6: The State shall guarantee the right of every child to education.

Section 7: The State shall guarantee equal opportunities for education to all, without discrimination as to gender, political, philosophical or religious opinion, social, cultural, linguistic or geographical origin.

Section 8: Education shall be apolitical.

Section 9: Primary education shall be compulsory.

Section 10: Public education shall be secular. Its neutrality and independence vis-à-vis all religions shall be guaranteed.

PART II

FORMULATION AND IMPLEMENTATION OF EDUCATION

POLICY AND FINANCING OF EDUCATION

Section 11: (1) The State shall formulate and implement educational policy with the assistance of regional and local authorities, families as well as public and private institutions.

To that end, the State shall:

- set the objectives and general guidelines for national teaching and training syllabuses in conjunction with all the sectors of national life in order to make education more professional;

- ensure the constant adaptation of the educational system to national economic and socio-cultural realities, and also to the international environment, especially through the promotion of bilingualism and the teaching of national languages;

- lay down the conditions for the creation, opening and running of government and private educational establishments and control them;

- define standards for the construction and equipment of public and private educational establishments and control them;

- draw and update the school location map.

(2) The State shall realize the above objectives with the assistance of an advisory body, the National Education Board whose organization, duties and functioning shall be laid down by decree of the President of the Republic.

Section 12: Education shall be financed by:

- budgetary allocations from the State;
- contributions from education partners;
- budgetary appropriations from regional and local authorities;
- donations and legacies;
- all other contributions provided for by the law.

Section 13: The responsibilities of the regional and local authorities in the implementation and financing of the education policy shall be defined by a separate law.

PART III
ORGANIZATION, EVALUATION OF THE EDUCATIONAL SYSTEM AND RESEARCH IN EDUCATION

CHAPTER I
ORGANIZATION OF THE EDUCATIONAL SYSTEM

Section 14: The organization and control of education at all levels shall be the bounden duty of the State.

Section 15: (1) The educational system shall be organized into two sub-systems: the English-speaking sub-system and the French-speaking sub-system, thereby reaffirming our national option for bi-culturalism.

(2) The above mentioned educational sub-systems shall co-exist, each preserving its specific method of evaluation and award of certificates.

Section 16: (1) The English-speaking sub-system shall be organized into cycles and fields of study as follows:

- nursery education with a duration of 2 (two) years;
- primary education with a duration of 6 (six) years;
- secondary education with a duration of 7 (seven) years;
- post-primary education with a duration of 2 (two) years;
- teacher training with a duration of 2 (two) to 3 (three) years.

(2) Secondary education shall comprise:

- a first cycle of 5 (five) years having an observation sub-cycle of 2 (two) years with a common-core syllabus and an orientation sub-cycle of 3 (three) years of general or technical education;

- a second cycle of 2 (two) years of general or technical education.

(3) In additional to general education, practical training shall be provided to students in vocational colleges and high schools, on the basis of the courses they choose.

Section 17 : (1) The French-speaking sub-system shall be organized into cycles and fields of study as follows :

- nursery education with a duration of 2 (two) years ;
- primary education with a duration of 6 (six) years ;
- secondary education with a duration of 7 (seven) years ;
- post-primary education with a duration of 2 (two) years ;
- teacher training with a duration of 2 (two) to 3 (three) years.

(2) Secondary education shall comprise :

- a first cycle of 5 (five) years having an observation sub-cycle of 2 (two) years with a common-core syllabus and an orientation sub-cycle of 3 (three) years of general or technical education ;

- a second cycle of 2 (two) years of general or technical education.

(3) In addition to general education, practical training shall be provided to students in vocational colleges and high schools, on the basis of the courses they choose.

Section 18 : (1) Certificates shall be issued in each sub-system as follows :

- at the end of the primary education level ;
- at the end of the first cycle of secondary education ;
- at the end of the second cycle of secondary education ;
- at the end of post-primary school training ;
- at the end of teacher training.

(2) Promotion to the second cycle of secondary education shall require obtaining the end-of-first cycle certificate.

(3) The certificates issued by the educational system shall be determined by decree of the President of the Republic.

Section 19 : The subjects for the various cycles and fields of study as well as the terms and conditions for choosing and changing the said fields of study shall be determine by statutory instruments.

Section 20 : (1) Professional circles shall, as and when necessary, be involved in the formulation and implementation of technical and vocational training policy, shift-training, course content and training aids, as well as in the evaluation and validation of the results of such training.

(2) The organization and functioning of the shift-training system shall, as and when necessary, be laid down by decree of the President of the Republic.

Section 21 : The objectives and general guidelines of national educational training programmes as well as the national school calendar shall be laid down by statutory instruments.

Section 22 : (1) The school year shall comprise at least 36 (thirty-six) weeks of effective classes.

(2) The educational regime shall comprise study periods and holiday periods.

Section 23 : Education shall be provided in the following educational establishments :

- nursery schools ;
- primary schools ;
- general education colleges and high schools ;
- technical or vocational education colleges and high schools ;
- post primary schools ;
- general and technical teacher training colleges.

(2) It may also be provided through a system of distance education.

Section 24 : (1) Private educational establishments shall assist in the task of education.

(2) They may be free or under contract.

(3) The private education regime shall be laid down by a separate law.

Section 25 : The education provided in schools shall take into account scientific and technological advancement and shall be tailored in terms of content and method, to national and international economic, scientific, technological, social and cultural trends.

Section 26 : All public or private educational establishments on the national territory shall be set up in accordance with the guidelines and criteria defined by statutory instruments.

Section 27 : (1) The premises of an educational establishment shall be inviolable.

(2) The heads of educational establishments shall be responsible for maintaining order in their establishments.

(3) The forces of law and order may intervene only at the express request of the head of the establishment.

(4) Where heads of establishments fail in their duty of maintaining order, they shall be automatically replaced by their hierarchy or by the supervisory authority.

Section 28 : (1) It shall be forbidden to set up gaming rooms, bars, cinema halls, tobacco stalls and any other nuisances within the premises and immediate surroundings of educational establishments.

(2) However, the sale of non-alcoholic beverages may be authorized within educational establishments.

Section 29: Educational counselling and psychology activities shall be carried out during the child's period of schooling at all levels of education.

CHAPTER II

EVALUATION OF THE EDUCATIONAL SYSTEM AND RESEARCH IN EDUCATION

Section 30: The State shall evaluate the educational system regularly.

Section 31: (1) The State shall encourage and support education research activities.

(2) Education research activities shall be carried out by bodies whose setting up, organization and functioning shall be laid down by statutory instruments.

PART IV

EDUCATIONAL COMMUNITY

CHAPTER I

THE CONCEPT OF EDUCATIONAL COMMUNITY

Section 32: (1) The educational community shall comprise all individuals and corporate bodies that contribute towards the functioning, development and prestige of a school.

(2) It shall comprise the following members:

- the authorities, the administrative and support staff;
- teachers;
- parents of pupils;
- students;
- persons from socio-professional circles;
- regional and local authorities.

Section 33: The members of the educational community shall be involved, through their representatives, in the consultative and management bodies set up at the level of educational, as well as at each level of the decentralized territorial authorities, or of the national educational set-up.

CHAPTER II

STUDENTS

Section 34: Students shall have the right to be taught the courses prescribed in the syllabus. This right shall be exercised in strict compliance with the students' freedom of expression, thought, conscience and information.

Section 35: The physical and moral integrity of students shall be guaranteed within the educational system. Consequently, the following shall be proscribed:

- corporal punishment and all other forms of violence;
- all forms of discrimination;
- the sale, distribution and consumption of alcoholic beverages, tobacco and drugs.

Section 36: (1) Students shall be required to accomplish all tasks relating to their studies.

(2) These shall include compliance with the instruments in force, as well as the internal rules and regulations of the school they attend.

CHAPTER III

TEACHERS

Section 37: (1) The teacher shall be principal guarantor of the quality of education. In this capacity, he shall be entitled, within the limit of means available, to suitable living and working conditions, as well as to appropriate initial and continuing training.

(2) The State shall ensure the protection of teachers and guarantee their dignity in the discharge of their duties.

(3) A decree of the President of the Republic shall lay down the special rules and regulations governing the corps of education personnel.

Section 38: Teachers shall, within the framework of academic freedoms and in the performance of their duties, enjoy complete freedom of thought and expression, while strictly respecting the students freedom of conscience and opinion.

Section 39: (1) Teachers shall be bound to teach, educate, provide educational guidance, promote the quest for scientific knowledge, carry out assessment and be of moral rectitude.

(2) Futhermore, they shall abide by the instruments in force, in particular, the internal regulations of the establishment where they teache.

PART V

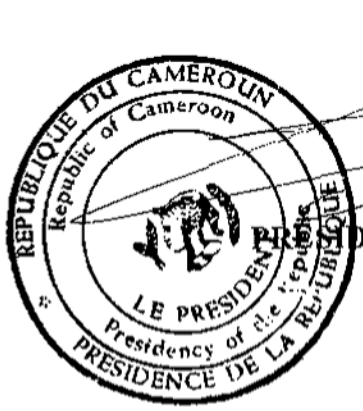
MISCELLANEAOUS AND FINAL PROVISIONS

Section 40 : The educational system governed by this law shall be set up progressively by instruments of implementation.

Section 41 : The current educational system shall remain and continue to function until the signature of the instruments of implementation provided for in Section 40 above.

Section 42 : This law shall be registered, published according to the procedure of urgency and inserted in the Official Gazette in English and French./-

YAOUNDE, 14 AVR. 1998



PAUL BIYA,
PRESIDENT OF THE REPUBLIC.

REPUBLIQUE DU CAMEROUN

PAIX - TRAVAIL - PATRIE

LOI N° 98 / 004 DU 14 AVR. 1998

D'ORIENTATION DE L'EDUCATION AU CAMEROUN.-

L'Assemblée Nationale a délibéré et adopté,
Le Président de la République promulgue
la loi dont la teneur suit :

TITRE I

DES DISPOSITIONS GENERALES

ARTICLE 1er.- (1) La présente loi fixe le cadre juridique général de l'Education au Cameroun.

(2) Elle s'applique aux enseignements maternel, primaire, secondaire général et technique, ainsi qu'à l'enseignement normal .

ARTICLE 2.- (1) L'Education est une grande priorité nationale.

(2) Elle est assurée par l'Etat.

(3) Des partenaires privés concourent à l'offre d'éducation.

ARTICLE 3.- L'Etat consacre le bilinguisme à tous les niveaux d'enseignement comme facteur d'unité et d'intégration nationales.

ARTICLE 4.- L'Education a pour mission générale la formation de l'enfant en vue de son épanouissement intellectuel, physique, civique et moral et de son insertion harmonieuse dans la société, en prenant en compte les facteurs économiques, socio-culturels, politiques et moraux.

ARTICLE 5.- Au titre de la mission générale définie à l'article 4 ci-dessus, l'Education a pour objectifs :

1) la formation de citoyens enracinés dans leur culture, mais ouverts au monde et respectueux de l'intérêt général et du bien commun ;

2) la formation aux grandes valeurs éthiques universelles que sont la dignité et l'honneur, l'honnêteté et l'intégrité ainsi que le sens de la discipline ;

3) l'éducation à la vie familiale ;

4) la promotion des langues nationales ;

5) l'initiation à la culture et à la pratique de la démocratie, au respect des droits de l'Homme et des libertés, de la justice et de la tolérance, au combat contre toutes formes de discrimination, à l'amour de la paix et du dialogue, à la responsabilité civique et à la promotion de l'intégration régionale et sous-régionale ;

6) la culture de l'amour de l'effort et du travail bien fait, de la quête de l'excellence et de l'esprit de partenariat ;

7) le développement de la créativité, du sens de l'initiative et de l'esprit d'entreprise ;

.../...

8) la formation physique, sportive, artistique et culturelle de l'enfant ;

9) la promotion de l'hygiène et de l'éducation à la santé.

ARTICLE 6.- L'Etat assure à l'enfant le droit à l'éducation.

ARTICLE 7.- L'Etat garantit à tous l'égalité de chances d'accès à l'éducation sans discrimination de sexe, d'opinions politique, philosophique et religieuse, d'origine sociale, culturelle, linguistique ou géographique.

ARTICLE 8.- L'enseignement est apolitique.

ARTICLE 9.- L'enseignement primaire est obligatoire.

ARTICLE 10.- L'école publique est laïque. Sa neutralité et son indépendance vis-à-vis de toutes les religions sont garanties.

TITRE II

DE L'ELABORATION, DE LA MISE EN OEUVRE DE LA POLITIQUE ET DU FINANCEMENT DE L'EDUCATION

ARTICLE 11.- (1) L'Etat assure l'élaboration et la mise en oeuvre de la politique de l'Education à laquelle concourent les collectivités territoriales décentralisées, les familles ainsi que les institutions publiques et privées.

A cette fin, il :

- arrête les objectifs et les orientations générales des programmes nationaux d'enseignement et de formation, en liaison avec tous les secteurs de la vie nationale en vue de la professionnalisation de l'enseignement ;

- veille à l'adaptation permanente du système éducatif aux réalités économiques et socio-culturelles nationales ainsi qu'à l'environnement international, particulièrement en ce qui concerne la promotion des enseignements scientifiques et technologiques, du bilinguisme et l'enseignement des langues nationales ;

- fixe les conditions de création, d'ouverture et de fonctionnement des établissements publics et privés et en assure le contrôle ;

- définit les normes de construction et d'équipement des établissements de l'enseignement public et privé et en assure le contrôle ;

- élabore et met à jour la carte scolaire.

.../...

(2) Il est assisté dans ces missions par un organe consultatif, le Conseil National de l'Education, dont l'organisation, les attributions et les modalités de fonctionnement sont fixées par décret du Président de la République.

ARTICLE 12.- Le financement de l'Education est assuré par :

- les dotations budgétaires de l'Etat ;
- les allocations budgétaires des collectivés territoriales décentralisées ;
- les contributions des partenaires de l'Education ;
- les dons et legs ;
- toute autre contribution prévue par la loi.

ARTICLE 13.- La responsabilité des collectivités territoriales décentralisées dans la mise en oeuvre de la politique de l'éducation et le financeement de celle-ci fait l'objet d'une loi particulière.

TITRE III
DE L'ORGANISATION,DE L'EVALUATION DU SYSTEME EDUCATIF ET DE LA RECHERCHE EN EDUCATION

CHAPITRE I
DE L'ORGANISATION DU SYSTEME EDUCATIF

ARTICLE 14.- L'organisation et le contrôle de l'enseignement à tous les degrés sont des devoirs impérieux de l'Etat.

ARTICLE 15.- (1) Le système éducatif est organisé en deux sous-systèmes, l'un anglophone, l'autre francophone, par lesquels est réaffirmée l'option nationale du biculturalisme.

(2) Les sous-systèmes éducatifs susévoqués coexistent en conservant chacun sa spécificité dans les méthodes d'évaluation et les certifications.

ARTICLE 16.- (1) Le sous-système anglophone est organisé en cycles et flières ainsi qu'il suit :

- l'enseignement maternel d'une durée de deux (2) ans ;
- l'enseignement primaire d'une durée de six (6) ans ;
- l'enseignement secondaire d'une durée de sept (7) ans ;
- l'enseignement post-primaire d'une durée de deux (2) ans ;
- l'enseignement normal d'une durée de deux (2) à trois (3) ans.

(2) L'enseignement secondaire comprend :

- un premier cycle de cinq (5) ans ayant un sous-cycle d'observation en tronc commun de deux (2) ans et un sous-cycle d'orientation de trois (3) ans d'enseignement général ou technique ;

.../...

- un second cycle de deux (2) ans d'enseignement général ou d'enseignement technique.

(3) En plus de l'enseignement général, une formation pratique est offerte aux élèves dans les collèges et lycées professionnels, selon leur orientation.

ARTICLE 17.- (1) Le sous-système francophone est organisé en cycles et filières ainsi qu'il suit :

- l'enseignement maternel d'une durée de deux (2) ans ;
- l'enseignement primaire d'une durée de six (6) ans ;
- l'enseignement secondaire d'une durée de sept (7) ans ;
- l'enseignement post-primaire d'une durée de deux (2) ans ;
- l'enseignement normal d'une durée de deux (2) à trois (3) ans.

(2) L'enseignement secondaire comprend :

- un premier cycle de cinq (5) ans ayant un sous-cycle d'observation en tronc commun de deux (2) ans et un sous-cycle d'orientation de trois (3) ans d'enseignement général ou technique ;

- un second cycle de deux (2) ans d'enseignement général ou d'enseignement technique.

(3) En plus de l'enseignement général, une formation pratique est offerte aux élèves dans les collèges et lycées professionnels, selon leur orientation.

ARTICLE 18.- (1) Les diplômes sont délivrés dans chaque sous-système ainsi qu'il suit:

- à la fin du cycle d'enseignement primaire ;
- à la fin du premier cycle d'enseignement secondaire ;
- à la fin du second cycle d'enseignement secondaire ;
- à la fin de la formation post-primaire ;
- à la fin de la formation d'enseignement normal.

(2) Le passage au second cycle d'enseignement secondaire est conditionné par l'obtention du diplôme de fin de premier cycle.

(3) Un décret du Président de la République détermine les certifications du système éducatif.

ARTICLE 19.- Les enseignements en cycles et filières, ainsi que les modalités de choix et de changement desdites filières sont fixés par voie réglementaire.

.../...

ARTICLE 20.- (1) Les milieux professionnels sont, en tant que de besoin, associés à l'élaboration et à la mise en oeuvre de la politique de formation technique et professionnelle, de la formation par alternance, des contenus et moyens de la formation ainsi qu'à l'évaluation et à la validation des résultats de cette formation.

(2) Un décret du Président de la République fixe, en tant que de besoin, l'organisation et le fonctionnement du système de formation par alternance.

ARTICLE 21.- Les objectifs et les orientations générales des programmes nationaux d'enseignement et de formation ainsi que le calendrier scolaire national sont fixés par voie réglementaire.

ARTICLE 22.- (1) L'année scolaire comporte au moins trente-six (36) semaines de cours effectifs.

(2) Le rythme d'enseignement comprend des périodes d'études et des périodes de vacances.

ARTICLE 23.- (1) L'enseignement est dispensé dans les établissements scolaires ci-après :

- les écoles maternelles ;
- les écoles primaires ;
- les collèges et les lycées d'enseignement général ;
- les collèges et les lycées d'enseignement technique ou professionnel ;
- les écoles post-primaires ;
- les écoles normales d'instituteurs de l'enseignement général et technique.

(2) Il peut également être assuré par un système d'enseignement à distance.

ARTICLE 24.- (1) Les établissements privés d'enseignement concourent aux missions de l'Education.

(2) Ils peuvent être libres ou sous contrat.

(3) Le régime de l'enseignement privé est fixé par une loi particulière.

ARTICLE 25.- L'enseignement dans les établissements scolaires prend en compte l'évolution des sciences et des technologies et, dans ses contenus et ses méthodes, est adapté aux évolutions économiques, scientifiques, technologiques, sociales et culturelles du pays et de l'environnement international.

ARTICLE 26.- Toute implantation d'un établissement public ou privé sur le territoire national doit se faire conformément à des orientations et aux critères définis par voie réglementaire.

ARTICLE 27.- (1) L'enceinte d'un établissement d'enseignement est inviolable.

(2) Les chefs d'établissement scolaire sont responsables du maintien de l'ordre dans leur établissement.

(3) L'intervention des forces de l'ordre ne peut y avoir lieu que sur réquisition expresse du chef d'établissement.

(4) En cas de défaillance dans l'accomplissement de leur mission de maintien de l'ordre, les chefs d'établissement sont suppléés de plein droit par les autorités hiérarchiques ou de tutelle.

ARTICLE 28.- (1) Toute implantation de salles de jeux, de débits de boissons, de salles de cinéma, de commerce de tabac et de toutes autres nuisances est interdite dans l'enceinte ou la périphérie des établissements scolaires.

(2) Toutefois, la vente des boissons hygiéniques peut être autorisée au sein des établissements scolaires.

ARTICLE 29.- Les activités d'orientation et de psychologie scolaires s'effectuent au cours de la scolarité de l'enfant à tous les niveaux d'enseignement.

CHAPITRE II

DE L'EVALUATION DU SYSTEME EDUCATIF ET

DE LA RECHERCHE EN EDUCATION

ARTICLE 30.- L'Etat procède à l'évaluation régulière du système éducatif.

ARTICLE 31.- (1) L'Etat encourage et soutient les activités de recherche en éducation.

(2) Les activités de recherche en éducation sont conduites par des organes dont la création, l'organisation et le fonctionnement sont fixés par voie réglementaire.

TITRE IV
DE LA COMMUNAUTE EDUCATIVE

CHAPITRE I
DE LA NOTION DE COMMUNAUTE EDUCATIVE

ARTICLE 32.- (1) La communauté éducative est l'ensemble des personnes physiques et morales qui concourent au fonctionnement, au développement et au rayonnement d'un établissement scolaire.

.../...

(2) En sont membres :

- les dirigeants, les personnels administratifs et d'appui ;
- les enseignants ;
- les parents d'élèves ;
- les élèves ;
- les milieux socio-professionnels ;
- les collectivités territoriales décentralisées.

ARTICLE 33.- Les membres de la communauté éducative sont associés, par l'intermédiaire de leurs représentants, aux instances de concertation et de gestion instituées au niveau des établissements d'enseignement, ainsi qu'à chaque échelon de concertation des collectivités territoriales décentralisées ou des structures nationales de l'éducation.

CHAPITRE II

DES ELEVES

ARTICLE 34.- L'élève a droit aux enseignements prescrits par les programmes. Ce droit s'exerce dans le strict respect de la liberté d'expression, de pensée, de conscience et d'information de l'élève.

ARTICLE 35.- L'intégrité physique et morale des élèves est garantie dans le système éducatif. Sont de ce fait proscrits :

- les sévices corporels et toutes autres formes de violence ;
- les discriminations de toute nature ;
- la vente, la distribution et la consommation des boissons alcooliques, du tabac et de la drogue.

ARTICLE 36.- (1) Les obligations des élèves consistent en l'accomplissement des tâches inhérentes à leurs études.

(2) Elles incluent le respect des textes en vigueur, y compris le règlement intérieur de l'établissement scolaire fréquenté.

CHAPITRE III

DES ENSEIGNANTS

ARTICLE 37.- (1) L'enseignant est le principal garant de la qualité de l'éducation. A ce titre, il a droit, dans la limite des moyens disponibles, à des conditions de travail et de vie convenables, ainsi qu'à une formation initiale et continue appropriée.

(2) L'Etat assure la protection de l'enseignant et garantit sa dignité dans l'exercice de ses fonctions.

.../...

(2) Un décret du Président de la République fixe le statut particulier du personnel des corps de l'éducation.

ARTICLE 38.- L'enseignant jouit, dans le cadre des franchises académiques et dans l'exercice de ses fonctions, d'une entière liberté de pensée et d'expression, dans le strict respect de la liberté de conscience et d'opinion des élèves.

ARTICLE 39.- (1) L'enseignant est soumis à l'obligation d'enseignement, d'éducation, d'encadrement pédagogique, de promotion scientifique, d'évaluation et de rectitude morale.

(2) Il est, en outre, soumis au respect des textes en vigueur, notamment le règlement intérieur de l'établissement où il exerce les fonctions d'enseignant.

TITRE V

DES DISPOSITIONS TRANSITOIRES ET FINALES

ARTICLE 40.- Le système éducatif régi par la présente loi sera progressivement mis en place par des textes d'application .

ARTICLE 41.- Le système éducatif en vigueur demeure et continue de fonctionner jusqu'à l'intervention des textes d'application prévus à l'article 40 ci-dessus.

ARTICLE 42.- La présente loi sera enregistrée, publiée suivant la procédure d'urgence, puis insérée au Journal Officiel en français et en anglais./-

YAOUNDE, le 14 AVR. 1998

LE PRESIDENT DE LA REPUBLIQUE,

PAUL BIYA.

RÉPUBLIQUE DU CAMEROUN
Paix – Travail – Patrie
UNIVERSITÉ DE YAOUNDÉ I

CENTRE DE RECHERCHE ET DE FORMATION DOCTORALE EN SCIENCES HUMAINES, SOCIALES ET ÉDUCATIVES

REPUBLIC OF CAMEROON
Peace – Work – Fatherland
The University of yaounde I

POST GRADUATE SCHOOL FOR THE SOCIAL AND EDUCATIONAL SCIENCES

B. P. : 755 Yaoundé
Email : crfd.shse@univ-yaounde1.cm
Siège : Face Bibliothèque Centrale de l'UYI

Réf : 22 0713 /UYI/CRFD_SHSE/TTJP/mma

ATTESTATION DE RECHERCHE

Je soussigné, Professeur TSALA TSALA Jacques Philippe, Coordonnateur du Centre de Recherche et de Formation Doctorale en Sciences Humaines, Sociales et Éducatives de l'Université de Yaoundé I, certifie que Monsieur ENGOZO'O Yvan Rony, Matricule 15V3981, est inscrit en cycle Doctorat/Ph.D au Centre de Recherche et de Formation Doctorale en Sciences Humaines, Sociales et Éducatives de l'Université de Yaoundé I.

L'intéressé doit effectuer des travaux de recherche en vue de la préparation de son diplôme de Doctorat/Ph.D en Sciences de l'Éducation sur le thème « The education system and the development of skills for digital economy : a case study of secondary school graduates in Cameroon ».

Je vous saurai gré de bien vouloir mettre à sa disposition toutes les informations susceptibles de l'aider dans son travail.

En foi de quoi, cette attestation de recherche lui est délivrée pour servir et valoir ce que de droit.

Yaoundé, le 12 DEC 2022

Le Coordonnateur du Centre de Recherche et de Formation Doctorale en Sciences Humaines, Sociales et Éducatives

Jacques Philippe TSALA TSALA
Professeur Titulaire

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
****
MINISTRY OF SECONDARY EDUCATION
****
SECRETARIAT GENERAL
****
PLANNING, PROJECTS AND COOPERATION DIVISION
****

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
****
MINISTERE DES ENSEIGNEMENTS SECONDAIRES
****
SECRETARIAT GENERAL
****
DIVISION DE LA PLANIFICATION, DES PROJETS ET DE LA COOPERATION
****

END-OF-INTERNSHIP CERTIFICATE

No. 23/23 /MINESEC/SG/DPPC/CELPLAN

To whom it may concern,

I, the undersigned Michel Bertrand Nassim, Conseiller Principal d'Orientation, Head of the Planning Unit of the Ministry of Secondary Education, certify that **Mr ENGOZO'O Yvan Rony**, Ph.D. student at the University of Yaounde I, Faculty of Education, Educational Management Department, registration no. 15V3981, has carried out research on the topic: ***"The Education System and the Development of Skills for Digital Economy: A Case Study of Secondary School Graduates in Cameroon"***, from January 02 to April 02, 2023. During this internship, he carried out his investigations at central services, with a focus on the Distance Learning Centre, and also at devolved services with Regional Delegations of Secondary Education.

In witness whereof, this certificate is issued to serve wherever need be.

Yaounde, 03 AVR 2023

Le Chef de la Cellule

REPUBLIQUE DU CAMEROUN REPUBLIC OF CAMEROON D.P.P.C. CELLULE DE LA PLANIFICATION Ministry of Secondary Education MINISTERE DES ENSEIGNEMENTS SECONDAIRES

Michel Bertrand Nassim
Conseiller Principal d'Orientation

AFRICA FEDERATION OF TEACHING REGULATORY AUTHORITIES

Fédération Africaine des Agences de Régulation de l'Enseignement

www.africateaching-authorities.org

Offices: Centurion, South Africa; Abuja, Nigeria; Accra, Ghana & Lusaka, Zambia

Certificate of Participation

This certifies that

ENGOZO'O YVAN RONY

Participated in AFTRA 10th Teaching and Learning Conference
held at the Safari Court Hotel, Windhoek, Namibia, May 09 - 11, 2023
In the following capacity

DELEGATE

Prof Josiah Olusegun Ajiboye
President

Prof Steve Nwokeocha
Executive Director (Academics)