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PEACE-WORK-FATHERLAND
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****
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****
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DEPARTMENT OF MANAGEMENT OF EDUCATION

EDUCATIONAL POLICY PLANNING OF ICT PROGRAM AND ITS EFFECT ON STUDENTS' COMPETENCE DEVELOPMENT IN TEACHER TRAINING COLLEGES IN CAMEROON.

Thesis defended on 2nd June 2023 to obtain Doctorate/Ph.D in Educational Management

By

AMOMBI DELPHINE AMANA

B. Ed (CST/GEO-UB), DIPEN II (ENS, YDE1) and M.Ed. (UBa)

Registration Number 18W6614

JURY

PRESIDENT :	**BIKOI Félix Nicodème**	
	Professeur	Université de Maroua
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	Maitre de Conférences	Université de Yaoundé I
	KONGNYUY Patrick KONGNYUY,	
	Maître de Conférences	Université de Bamenda
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	Professeur	Université de Buea
	NJEUMENI TCHAMABE Marcelline,	
	Maître de Conférences	Université de Yaoundé I

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TITLE PAGE

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AMOMBI DELPHINE AMANA

Registration No:18W6614

Supervisors

Professor MBAHA JOSEPH PASCAL **Professor KONGNYUY PATRICK WANYU**

JULY 2023

APPROVAL PAGE

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……..

PRESIDENT OF JURY

Supervisors

Professor MBAHA JOSEPH PASCAL **Professor KONGNYUY PATRICK WANYU**

NAME---------- NAME----------

EXTERNAL EXAMINER HEAD OF DEPARTMENT

NAME……

DEAN OF FACULTY

DECLARATION

I, Amombi Delphine Amana, student of Educational Management, Department of Educational Management of the University of Yaounde 1, with Registration No: 18W6614 hereby declare that this piece of work was written by me and it bears a record of my research work under the supervision of Professor Mbaha Joseph and Professor Patrick Kongnyuy. All used materials have been acknowledged by means of citations and references.

AMOMBI DELPHINE AMANA

Registration No:18W6614

Date……

CERTIFICATION

This is to certify that this thesis entitled “Educational policy planning of ICT program and its effect on students’ Competence development in teacher training colleges in Cameroon” was carried out by AMOMBI DELPHINE AMANA (Registration No:18W6614) in Department of Educational Management of the University of Yaounde 1, in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy (Ph.D) in Education management, under our supervision and guidance.

Professor MBAHA JOSEPH PASCAL and Professor KONGNYUY PATRICK W.

THESIS SUPERVISORS

DEDICATION

To my late husband

Dr/Pst. Ebai Wilson Ebai

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The accomplishment of a study of this magnitude required a great deal of help and support. Therefore, it is chest note to say that it could not have been possible without the following people but truer words are never spoken.

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ABSTRACT

This study entitled “Educational policy planning of ICT program and its effect on students’ Competence development in teacher training colleges in Cameroon.” This work was inspired by the institution of the 2013 computer based program in Teacher Training colleges. It was put in place to enable student teachers acquire professional skills and knowledge as they use the computer in learning and teaching within the framework of competence based teaching. The researcher seeks to understand the role effective ICT program planning plays in enhancing professional development of student teachers and to propose a model to ameliorate the planning of ICT in Teacher Training Colleges. This information will contribute to the achievement of the fourth sustainable Development goals of quality education and promote lifelong learning opportunities for all. It was conducted with the aim of attaining four(4) objectives which were:- Determine the extent to which ICTs program norm affect students’ professional development in teacher training colleges; investigate how ICTs program planning process affects students’ professional development in teacher training colleges; establish the extent to which ICTs program planning context affects students’ professional development in teacher training colleges and finally investigate how ICTs program planning constraints affect students’ professional development in teacher training colleges. A survey research design was used. Quantitative(questionnaire) and qualitative(interview) methods were used to collect data for the study. The questionnaire and the interview guides were pre tested and validated by experts from the University of Bamenda and University of Yaounde I. The population for the work included teacher trainers in teacher training colleges and ICT pedagogic inspectors in Cameroon. A sample size of 417 was chosen from a target population of 1619 student teachers. Simple random sampling technique was used to select respondents for the questionnaire, while purposive sampling technique was used to select participants for the interview. Then data was collected directly using the Direct Delivery Technique (DDT) and through social media (WhatsApp, email). Descriptive and inferential statistics were used to analyse the data collected through questionnaire using the SPSS model. The Pearson Product Moment Correlation, and the mean ratings were computed using the Statistical Packages for Social Sciences (SPSS) computer software version 25.0. at 0.05 the level of significance. Findings revealed that ICT program planning norms significantly affect students’ professional development in TTCs (P= 02.00) with a coefficient of 0.13 and 80% responses from interview to confirm; ICT program planning process significantly affects students’ professional development in TTCs (P= 02.00) with a coefficient of 0.15 in addition to 100% of respondents confirming through interview; ICT program planning context significantly affects students’ professional development in TTCs (P= 16.00) with a coefficient of 0.40 with a total of 80% participants from interview sharing same view; and ICT program planning constraint significantly affects students’ professional development in TTCs (P= 26.00) with a coefficient of 0.51 and 80% responses from interview to confirm that there is an impact . A model on ICTs program was proposed titled “A Model of ICT program planning and students’ Competence development in TTCs”. Based on the above findings, it was recommended among others that a participatory ICT planning wherein all stakeholders are involved should be encouraged.

Keywords: ICTs, policy planning, Competence development and Teacher Training Colleges

RÉSUMÉ

Cette étude intitulée "L'effet de la planification du programme des TIC sur le développement Competence des élèves des Ecoles Normales d'Instituteurs (ENI) au Cameroun". Ce travail nait de la création du programme d'informatique de 2013 mis sur pied au sein des Ecoles Normales d'instituteurs (2013). Eu égard à l'usage de l'ordinateur dans le processus d'enseignement – apprentissage et la perspective de l'enseignement basé sur la compétence, ce programme a été créé pour permettre aux élèves –professeurs d'acquérir des compétences professionnelles et des connaissances. Cette étude cherche à comprendre la rôle que joue l'efficacité de la planification du programme de Tic dans la formation des élèves-maîtres et proposer un modèle ladite planification au sein des Ecoles Normales d'instituteurs au Cameroun. Cette information peut contribuer à l'atteinte de l'objectif 4 du développement durable relative à la qualité de l'éducation et à la promotion des opportunités d'apprentissage tout au long de la vie pour tous. Cette étude a été menée dans le but d'atteindre quatre (4) objectifs qui sont : Déterminer dans quelle mesure la norme du programme des TIC influence le développement professionnel des élèves des ENI ; déterminer sur la façon dont le processus de planification du programme des TIC influence le développement professionnel des élèves des ENI ; établir dans quelle mesure le contexte de la planification du programme des TIC influence le développement professionnel des élèves des ENI et enfin déterminer la façon dont les contraintes de la planification du programme des TIC influence le développement professionnel des élèves des ENI. Un modèle de recherche par enquête a été utilisé. Des méthodes quantitatives (questionnaire) et qualitatives (entretien) ont été utilisées pour collecter les données de l'étude. Le questionnaire et les guides d'entretien ont été pré-testés et validés par des experts de l'Université de Bamenda et de l'Université de Yaoundé I. La population de cette étude est constituée de formateurs d'enseignants des ENI et les inspecteurs pédagogiques des TIC au Cameroun. Un échantillon de 417 a été choisi à partir d'une population cible de 1619 élèves. La technique d'échantillonnage aléatoire simple a été utilisée pour sélectionner les répondants au questionnaire, tandis que la technique d'échantillonnage raisonné a été utilisée pour sélectionner les participants à l'entretien. Les données ont ensuite été collectées directement à l'aide de la technique de remise directe (DDT) et par le biais des médias sociaux (WhatsApp, email). Des statistiques descriptives et inférentielles ont été utilisées pour analyser les données recueillies par le biais du questionnaire en utilisant le modèle SPSS. La corrélation du moment produit de Pearson et les évaluations moyennes ont été calculées à l'aide du logiciel SPSS (Statistical Packages for Social Sciences), version 25.0, à un niveau de signification de 0,05. Les résultats ont révélé que les normes de planification des programmes de TIC influencent significativement le développement professionnel des élèves dans les ENI (P= 02.00) avec un coefficient de 0.13 ; le processus de planification des programmes de TIC influence significativement le développement professionnel des élèves des ENI (P= 02.00) avec un coefficient de 0. 15 ; le contexte de planification du programme de TIC a une incidence significative sur le développement professionnel des étudiants dans les TTC (P= 16,00) avec un coefficient de 0,40 ; et la contrainte de planification du programme de TIC a une incidence significative sur le développement professionnel des élèves des ENI (P= 26,00) avec un coefficient de 0,51. Un modèle sur le programme des TIC a été proposé intitulé "Un modèle de planification du programme des TIC et le développement professionnel des élèves des ENI". Sur la base des résultats ci-dessus, il a été recommandé, entre autres, qu'une planification participative dans laquelle toutes les parties prenantes sont impliquées devrait être encouragée.

Mots-clés : TIC, planification des politiques, développement Competence et écoles normales.

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LIST OF ABBREVIATIONS

ANTIC: The National Agency for Information and Communication

CAPIEMP: Certificat d'Aptitude Professionelle d'Enseignement Maternelle et Primaire

CBA: Competence Base Approach

CEP: Certificate d'Etudes Primaires

CIPP: Context Input Process Product

DET: Didactics of Educational Technologies

DSCE: Strategic Document on Employment

EPA: Education for All

ESD: Education for Sustainable Development

FSLC: First School Leaving Certificate

GBTTC: Government Bilingual Teachers Training College

GESP: Growth and Employment Strategy Paper

GRADE 1: Certificate Examination for Nursery and Primary School teachers

GTTC: Government Teachers Training College

HTTC: Higher Teacher Training College

HTTTC: Higher Technical Teacher Training College

ICT: Information and Communication Technology

MDE: Millennium Development Goals

MINEDUB: Ministry of Basic Education

MINISEC: Ministry of Secondary Education

NGO: Non-Governmental Organization

NICI: National Information and Communication Infrastructure

PASEC: Program d'Analyses de system Educative

RDSE: Regional Delegation of Secondary Education

SPSS: Statistical Package for Social Studies

SSET: Sectional Strategy of Education and Training

TPACK: Technological Pedagogic content knowledge

TTCs: Teachers Training Colleges

UNESCO: United Nation Educational, Scientific and Cultural Organization

UNICEF: United Nation International Children Educational Fund

GENERAL INTRODUCTION

Primary school education is critical to the development of learners' skills and knowledge which are highly needed in this highly competitive world. To ensure skills and competence, Cameroon has made many efforts to integrate ICT to the Education process (Mbangwana, 2008). Integrating ICTs in education require a well calculated plan. Proper planning is needed for an educational system to produce all its envisioned benefits. Educational planning started with the invention of schooling. In addition, governance and management, growth and employment strategies were the cardinal points that were focused on to ensure Cameroon emerge by 2035. This is implied in the strategic document on employment (DSCE) program develop by the government of Cameroon. Management framework of the state should be more visible and readable though a readable strategic management (Tchombe, 2014) This imply adequate planning for decentralization, modernization, harmonization, human resources and Information and Communication technologies. Teachers are the foundation of quality educational system, there is need therefore to add value to their quantity, effectiveness, and efficiency. Educational planning takes place at the micro and macro level. At the macro level, educational planning looks at the state of the society; where it wants to go and determines what it will require educationally to get there. It determines the types and levels of education to satisfy both students and society's needs. At the micro level, ie institutional level, the school administrator is obliged to look ahead and make preparations for the next academic year.

The government of Cameroon has made several efforts in encouraging cyber education with the help of the World Bank initiative. The Cameroon National Information and Communication Infrastructure (NICI) Policy, United Nations Development Program (UNDP)and United Nation Economic Commission for Africa (UNECA) prepared a plan recognizing ICT as a national priority. In Cameroon, the ICT initiative is plagued by many challenges like low level of electrical power supply, insufficient number of up to date computers and related equipments in schools, insufficient training and motivation for teacher trainers on ICTs, policy weaknesses on integration of ICTs among others. A majority of teachers (including teachers in teacher training colleges) are computer illiterate and require long training and capacity building programs to enable them use ICTs effectively (Josué, 2007; Mbangwana, 2008). These capacity building programs are rare to come by except for occasional one- or two-days' seminars organized and supervised by various subject departments of Regional Delegations of Education. A World Bank (2003) report cites the potential that ICT has to improve efficient delivery of resources to the poor, to bring markets

within reach of rural communities, to improve government services, and to transfer knowledge needed to meet the Millennium Development Goals.

It was stated that since education is a process which needs to be sustained, its practice is largely influence by educational policies. Educational policy is use to enhance the educational process. New policy orientation in the 1998 education law called for development of educational programs that will respond to the needs of our dynamic society as well as great emphasis on science and technology (Tchombe, 2003). Understood as statement of commitment on the part of Government, educational policies- including legislation, plans of action, curricula, training policies and so on should explicitly promote a right based approach to education. Policies are developed in a more participatory in cooperation with all stakeholders and fulfill a country's international treaty obligations to provide and promote quality education. This was christalized by Mbua (2003) who acknowledged that education is largely influenced by educational policies and because education is dynamic and not static educational policies also assume this dynamic nature.

Educational Managers fall in the area of policy and policy making. This is policy because policy making involves decision making. In this connection, educational administrators or managers are effectively involved in the implementation of policy decisions (Mbua, 2003). In Cameroon, primary teacher education constitutes part of secondary education but is run by the ministry of secondary education and it was formally run by ministry of Basic education. Specific objectives of these sections are to train teachers for primary education. Candidates are admitted through a competitive examination. Graduates look for employment from either the public or private sectors.

New syllabuses for teacher training colleges were officially put in place by the Ministry of Secondary Education with the main objective as to upgrade the quality of teacher training. The new syllabus was constructed in line with the Competency-Based Approach which seeks to ensure students develop skills. It also witnessed the introduction of two subjects: - Didactics of Educational Technologies and Information and Communication Technology (MINESEC, 2013).

According to UNESCO (2014a) cited in Leicht, et al. (2018) there has been the launching of regional frameworks such as the Sub-Saharan Africa and the Mediterranean strategy on education for sustainable development (ESD). These frameworks have been endorsed by UNESCO and on educational policy planning, expertise sharing, support

knowledge, monitoring and reporting, as well as higher political incentives. Also, Leicht, et al. (2018) hold that national bodies establishment has been a cardinal element to effective educational policy planning and policy making on ESD in many member countries. These coordination bodies are more often cross-ministerial and multi-stakeholders to facilitate planning and development of policies and strategies. According to UNESCO (2014a) cited in Leicht, et al. (2018) ESD related policies are focused on giving a new orientation to education curriculum (emphasis on ICT in schools), quality teachers training, and quality learning environment (equip with technology).

In other to ascertain this appraisal, a correlational design was adopted with a triangulation in the collection of data using and interview guide and a questionnaire. The collected data was analyzed both descriptively and inferentially with spearman rank correlation and person product moment correlation.

CHAPTER ONE
BACKGROUND OF THE PROBLEM

1.0. INTRODUCTION

This chapter present the historical background, contextual background, conceptual background, theoretical background, the formulation of the problem of the study, and definition of the concepts of the study.

1.1.0. HISTORICAL BACKGROUND

This section will examine the trends of educational program planning, educational policy planning with focus on Cameroon, a run-down of the history of ICT, an in-depth trends of Information and Communication Technology (ICT), trends of ICT policy planning in Cameroon, and evolution of students' professional development.

1.1.1. Educatonal program planning

The training of educational program has always been determined by societal trends or changes. Stevenson (2007) presents eleven trends of events that have influence educational program planning. However, this work is going to examine the first four. This is because it is at the fourth trend that technology influences the planning of educational programs for schools. These trends are influenced by schools' facilities, students' productivity, initiatives, current events, and difficulties faced in the educational sector.

According to Stevenson (2007) the first trend that influences educational program planning was the issue of 'choice' and 'equity'. Educational planning is greatly influenced by 'choice' and 'equity'. This is explained by the fact that in most countries in the world, children of school going age had mainly public education as the available choice (Stevenson, 2007). Therefore, educational planning was relatively very simple process. During this era schools traditionally had geographical boundaries that were fixed, planning was done exploiting local demographic as well as projection techniques in enrolment to determine services and programs to be rendered to learners.

This is trend has highly been overturned by current trends where educational and educational planning reforms have created school choice as a standard principle (Stevenson, 2007). Over the years parents and educational policy makers who were not satisfied with the public educational system advocated for an end to public monopoly over education, both at the level of planning and implantation. Increasingly in most countries in the world, law makers

and educational planners are accepting and taking into consideration in policy and planning the choice of parents and learners in school and program choice.

The second trend has to do with planning and making policies on private (neighbourhood) school (Touch, 2003 cited in Stevenson, 2007). According to Wasley et. al. (2002) cited in Stevenson (2007) argue that advocates of this trend hold that small schools are very instrumental in improving the academic development of learners who once experienced public or traditional schools. These smaller schools (private schools) improve the quality of students' performance, experience higher graduation rates, promote greater learners' engagement in co-curricular activities, and are better behaved than those in the public or traditional schools. This is because the internal educational planners and policy makers do plan that will facilitate closer administrators, teacher and student relationship. Therefore, instructions are individualised at conception, implementation, delivery and execution. The program planning process is individualised as it takes into consideration the respective individual academic needs of the learners. However, the increasing consents have been the cost of running private schools as parents are highly taxed.

The third trend of educational program planning focuses on better implementation through class size reduction. According to Achilles (2003) cited in Stevenson, (2007) interest in educational planning has taken a great interest in classrooms with fewer learners. They believe that smaller class size more educational productive than average or larger classrooms. They facilitate the effective implementation of planning as well as programs which result in quality academic performance, better student behaviour, and high morale in teachers (Finn and Pannozzo, 2003 cited in Stevenson, 2007). Educational planners acknowledge the high cost of running smaller classes and have resulted to an educational issue. Stevenson, (2007) states that smaller class issue greatly impacts school planning and design. This is because it demands more in terms of program planning and facilities.

The fourth trend which is very important to this work is that of introducing technology into the educational system. Educational program planners thought to ensure effective program implantation, solve problems of planning itself, put in place effective cost control methods, reduce teacher-pupil ratios, and curb higher energy cost; there should be the introduction of modern technology (ICTs) in all the educational processes (Stevenson, 2007). Berge and Clark (2005) cited in (Stevenson, 2007) suggested virtual processes from program planning to program implementation through virtual education (e-school). Educational program planning

was expected to focus on meeting the devised specialised needs (advanced courses) of students through circuit television, then later internet.

The planning of these programs which is the current trend reduces required personnel as well as cost. However, this trend of program planning took a different turn with the suggestion of Snyder (2004) cited in Stevenson (2007), who suggested the planning and use of computers, software, and networks in program planning and delivery. The focus of education planners and designers today is the development of effective and efficient use of technology in education, while shifting program planning and instructional practices landscape to technology at the centre ICT.

1.1.2. Historical trends of Educational policy planning

The advent of the 21st in the field of global educational policy was well prepared for with the creation of the International Commission on Education. According to Leicht, et al. (2018) this commission from 1993 to 1996 under the chairmanship of Jacque Delor engaged in a series of studies as well as global consultations. These studies and consultations were focused on educational reforms (policy change) to meet up with the challenges of the fast approaching 21st century. The final report on policy orientation according to Delors (1996) as cited in Leicht, et al. (2018) stated that reduction of poverty, ignorance, exclusion, oppression, and wars are based on the fundamental means of education in fostering human development in a deeper and more harmonious way. The report emphasised that education policy planning should be orientated towards making education an undisputable stimulus and source for realisation of a learning society based on acquisition, renewal, and used knowledge through lifelong learning.

Furthermore, International Commission on Education for the 21st Century (1996) as cited by Leicht, et al. (2018) adapted four and later five pillars taking into consideration Education for Sustainable Development (ESD). These five pillars were meant to serve as major policy planning guide lines on the conceptual outcome of education as well as work to be achieved. These pillars are:

i. Learning should be focused on to know by acquiring the instruments of understanding;
ii. Learning should be focused on doing enabling creativity in the learner's environment;
iii. Learning should be focused on living together, to facilitate participation and cooperation in all human activities;
iv. Learning should be focused on being, remarked by progress

v. And later, Learning should be focused on transforming the individual and the society, by empowering individuals with values and abilities to take up responsibility for the creation and enjoyment of a sustainable future (Scaeffer, 2006 cited in Leicht, et al. (2018).

These pillars have greatly guided educational policy planning in the late 20th century and in the 21st century.

Global educational policy planning has evolved with time and societal as well as global needs. Wils et al. (2009) under the auspices Educational Policy and Data Center states that global educational policy planning has especially at the beginning of the 21st century for developing countries focused on a number of issues: Early childhood access to primary and secondary education, gender equality in access to education, income, and urban/ rural residential areas; projections on attaining Education for All (EFA) by 2015 global goal; population growth projections from the perspectives of pupils/students, teachers, as well as the youth; examining the role of non-formal education; and above all the relationship between education and health. However, little emphasis was laid on quality, technology, and effectiveness of government as factors of a good educational policy planning and system.

The year 2000 recorded a major shift in global educational policy planning. This year marked the world Education Forum that saw the convergence of world leaders in Darker, the political headquarters of Senegal. According to Wils et al. (2009) in 1990 there was the World Conference on Education for All. With many countries facing difficulty to attained the six goals amongst which goal 2 focused on "universal primary education by 2015". The UNESCO organised Dakar forum was to get effective engagement from member states on the policy of Education for All (EFA). This conference was in line with Millennium Development Goals (MDG). While this policy has experienced a lot of progress, Wils et al. (2009) projected the possibility of the world achieving Education for All by the year 2020 was difficult. This was explained by the low level of increment in enrolment and insufficient acceleration measures by some countries. On the other hand, if these countries ameliorate school enrolment rates and put in place concrete measure, then by 2015 the policy will be near attainment.

1.1.2.1. History of Educational policy planning in Cameroon

To better understand the policy issues involved in the training of the Cameroonian primary school teachers on the integration of ICTs in pedagogy, it is important to examine the evolution of education and the different policies that guided education in Cameroon from the

pre-colonial, colonial and post-colonial periods. The discussion is also focused on the evolution of teacher education, pedagogic practice and the various instructional media used during these periods. Instructional media here refers to indigenous and advanced-computer related (ICT) materials used to facilitate teaching and learning. These tools have influenced the development of models, strategies and methods of teaching and learning in education (Kibinkiri, 2014). Cameroon like other African communities had its indigenous system of education that has seen several changes in policies and reforms over time based on its colonial history. This indigenous system of education was based on apprenticeship where children acquired skills in different domains like agriculture, weaving, hunting by being attached to a parent, family friend or relative who grooms the child in the chosen area.

Therefore, they developed "professional" life skills that enabled them earn a living. This however was down played by Christian missionaries and colonial powers who took over control of education based on their benefits. The collaboration between the colonial governments and the western Christian Missionaries resulted in the establishment of colonial formal schools in Cameroon (Tamanji, 2011). Formal education in Cameroon as a consequence is closely linked to the West through trade, Evangelism and Colonialism (Kibinkiri, 2014). The evolution of this system of education can be traced in terms of the major landmarks in the political evolution of the country. Historically, formal education planning policy in Cameroon from 1844 to present can be split into five cultural epochs.

Educational planning in the Pre-Colonial Era (1844-1884)

Ngoh (1987) contends that the Baptist missionaries were the first to arrive Cameroon after the abolition of the slave trade in the British Empire in the 1830s. Their primary motive was to proclaim the "glad tidings" to Africa which was later complemented by a search for scientific and economic goals geared towards the opening up of more lands in Africa for resources. Shu (2000) contends that Formal education policy planning in Cameroon was initiated by the Baptist Missionary Society (BMS). In the same light, Tamanji (2011) holds that Reverend Joseph Merrick of the Jamaican London Baptist Missionary Society opened the first primary school in Bimbia in 1844 with an initial enrolment of 62 children. Since then the school system in Cameroon has grown steadily into a complicated network managed by the government, churches and private individuals (Kibinkiri, 2014).

After Joseph Merrick, came Alfred Saker. A year after the Reverend Joseph Merrick, in 1845, Alfred Saker started building schools and churches in Douala. The second formal

school in Cameroon was the Bethel formal school in Douala, founded in 1845 along with a Mission Station by the Reverend Alfred Saker (Tamanji, 2011). In 1869, another school was opened in Bota, placed under Charles Steane. In 1873, Reverend Quintin Thompson opened a school at Bojongo and another at Mapanja under Stephen Burnley and another in 1879 at Banga in Kumba, under Reverend C.H. Richardson (Ngoh, 1996). During that period, schools were concentrated only in the coastal areas that is Victoria (Limbe) and Douala (Tambo, 2003).

The thrust of the Missionaries was on primary education as secondary education was not yet in their agenda. The policy of curriculum planning laid emphasis on English Language, Reading, Writing, Arithmetic, drawing, singing and the study of the Bible. Native languages were used in teaching especially in the lower classes and the main objective of schooling was evangelization (Tambo, 2003). The Bible was their main curriculum document and based on it's the role of education in learning the Bible, school attendance was made compulsory. With regards to educational policy, Ngoh (1996) contends that enrolment by 1881 stood at 130 boys and 80 girls who influenced the London Baptist Mission to send two additional teachers- Dixon and Ms. Carrie Comber. Kibinkiri (2014) states that methods, structures and content of the schools responded to the evangelization mission, without reflections on the needs and interests of the people or any consideration for what had existed. The missionaries were only interested in spreading the "glad tidings" (Ngoh, 1989).

Educational planning in the German Colonial Era (1884-1914)

When the British failed to annex Cameroon despite their trading and missionary influence in the area, the Germans overtook them in 1884. German administrators did not treat education as a priority for more than a decade after annexation because the imposition of German colonial rule had created many problems that needed to be resolved quickly (Tambo, 2003). The London-based Baptist missionary society that had been operating in Cameroon since 1884 was forced to leave as they were not tolerated by the German colonial administration. After annexation, the London based Baptist Missionary Society had to hand over their schools to the Germans. The type of education policy that developed was predominantly technical and vocational. This type of education policy planning implies that there was the use of tools in education to help people develop skills.

This also means that the use of instructional materials to learn is not a new phenomenon in Cameroon (Kibinkiri, 2014). The curriculum that evolved emphasized Germanic studies. The mission ceased to dominate education during the period of German rule. Tambo (2003)

posits that in addition to the Basel mission which replaced the Baptist Missionary Society in 1886, there were also the German Baptist Mission, the American Presbyterian Mission, and the Pallotine mission. Throughout the German period, there were only five Government elementary schools out of a total of 793 schools in operation in German Cameroon. The figures reveal that the missions continued to be more active than the German Government in promoting education (Tambo, 2003).

By 1892, the Germans began some serious effort in education policy planning. According to Tambo (2003), three German educationists- Betz, Christaller and Kobele were assigned to draw up a syllabus for Government schools in Cameroon and Togo. This five year course syllabus emphasized the teaching of German language. In 1907, following the syllabus work, an educational conference was held in Douala to formulate official guidelines for education in Germen Cameroon. This led to the publication of the educational law in 1910 (Tambo, 2003), majoring as a result of educational policy planning. From this year on, the German colonial Government assumed control and regulation of education in both Government and mission schools. Worthy of note is the fact that under German rule, education ceased to be in the hands of one authority as more religious bodies complemented the Government in education.

Also, schools were no longer limited to coastal towns but were established further inland. The English language was also replaced by the German language as a medium of instruction, particularly in the higher classes of elementary school. Mission schools received financial subventions by the German Government to encourage them expand the German language. Learners were expected to stay in school until the end of the term or pay for the costs while parents who kept their children from school were fined. School age was recommended at five of six years although older children, some in their teens were also admitted (Ngoh, 1996).

Government assumed supreme authority in the control of education and designed syllabuses that were used in mission schools. The policy of vocational, technical and teacher education was initiated during this era. In 1910, an agricultural school was opened in Victoria to train selected indigenous graduates from Government or mission elementary schools for agricultural work in the colony. They were expected to sign a contract with the government to stay in school for two years and work with the government for five years after school, or pay a fine of 200 marks each year if they don’t. Similar agricultural schools were established in Dchang, Yaounde, Douala and Garoua.

The majority of teachers came from Wurtenburg and applied the elementary school program of Germany which was slightly adapted to the Cameroon situation. The curriculum included the teaching of arithmetic, reading and writing German, some religious instruction and agriculture (Ngoh, 1987). Ngoh (1996) posits that the German colonial administration sent some young Cameroonians for further education in Germany. These came mostly from the privileged social class in Douala like Tube, Alfred Bell, Mpondo Akwa, Rudolf Douala Manga Bell. This further education benefitted the parents and students as their prestige was increased while the German colonial administration benefitted from their promotion of German colonial policy upon their return.

Educational planning during the French and British Mandates (1922-1946)

In 1914, the First World War broke out and spread to the African colonies including German Cameroon. This led to the defeat of Germany by a joint force of French and British troops. This led to the ousting of German missionaries and administrators and created a vacuum in educational leadership as the French and British partitioned the territory (Tambo, 2003). The French took four-fifth of the territory while Britain took one-fifth (Ngoh, 1987). There was the problem of switching from German to French language in the French administered portion and from German to English in the British administered area. For these reasons, the period from 1914 to 1922 witnessed a standstill or focused mainly on reorganization by the new government and missionary bodies. The French administered their portion of the territory using the policy of Assimilation, which aimed at turning the citizens to "black French men", while the British used Indirect rule, using local indigenous authorities to govern the people. These policies greatly influenced the pattern of educational policy planning in each territory.

Educational planning during the Education under the French Mandate (1916-1945)

Tambo (2003) posits that the French colonial administration began to exercise its authority in the territory in education as early as 1920 after the signing of the Treaty of Versailles. Between 1920 and 1921, two Government orders were signed regulating private and public schools. Among other things, the orders specified that only schools which teach exclusively in French and followed the prescribe32`d Government syllabus will be recognized and would receive financial support from the Government.

The 1921 Order regulating public schools, arranged them into five categories: village schools, regional schools, higher primary schools, domestic science schools and vocational schools. Other Orders signed in 1925, 1927 and 1930 together guaranteed not only a steady

educational expansion, but also collaboration between the Government and voluntary agencies. Fanso (1989) contends that the French Government granted subsidy in 1929 to raise the salaries of staff in private mission schools who agreed to use French as medium of instruction. Subsidies were also given to schools that taught the approved curriculum, with the Mandate Commission of the League of Nations studying the progress of education yearly and pressurized the mandatory powers to do more.

The educational policy also permitted for missionary bodies also assisted in education. The American Presbyterian and American Adventist were allowed to run schools using vernacular and not French (Fanso, 1989). Public primary schooling was organized differently in form and content, in the villages, compared to the district and urban schools. Primary elementary education was given in three types of schools: Government village school, usually with one teacher and always poorly equipped, gave pupils elementary knowledge in French. In the more advanced of such schools, agriculture and sanitation was taught. Beyond village schools, came district schools where learners enrolled at the age of six and graduated at age thirteen. During the last two years in the district schools, pupils learnt history, geography, and arithmetic. French was both the principal subject in the school curriculum and the medium of learning (Fanso, 1989). Graduates from district schools were expected to return and be agents of propagating French assimilation in their respective villages.

Also, in the main towns, principally Yaounde and Douala, urban primary schools were created with their curriculum almost entirely academic. Graduates of these schools were expected to serve as clerks in government offices, business establishments, railways and ports. By the end of the French mandate in Cameroon, 137 public primary schools, 1,188 private primary schools, 3 private higher primary schools, 5 public secondary schools and 2 private secondary schools were opened in French Cameroon (Shu, 1985). According to Ngoh (1987), there were 85,000 Cameroonian children in mission elementary schools with French Roam Catholic mission accounting for 35,000; the American Presbyterian Missions accounting for 31,500, the French Protestant mission had 18,000 and the American Adventists Mission 500. The Government schools had a total of only 10,000 pupils.

The Government in the education policy orientation also had several rural and regional primary schools with an advanced primary school in Yaounde, a professional school in Douala and a professional health school at Ayos. There were secondary and technical schools like the *Ecole Normale* at Foulassi run by the protestant missions. With respect to teaching staff, there were 3 French inspectors of schools in 1944, 38 European school teachers, with 10 having no

teaching diplomas and 250 African monitors, who were French Cameroonians trained to teach but not fully qualified and could not teach in any school in France (Ngoh, 1987). Fanso (1989) holds that French Cameroon had the best educational system in French Black Africa. This was partly because they took over a territory where the Germans had already laid a platform for education.

Educational planning during the Education under the British Mandate (1916-1945)

Ngoh (1987) holds that education was not vigorously pursued by the British colonial administration in British Cameroon. Elementary education was provided by Government schools, Native Administration schools, mission schools and vernacular schools. According to Tambo (2003) education in the British Cameroon started off less smoothly than in the French administered section. In educational policy planning the colonial Government regulation of 1924 made education uniformed, with free education for infants, while primary schools charged six pence a month (Ngoh, 1987). The use of vernacular was prohibited in Government schools as learners came from different tribes. Pidgin English was however tolerated in the initial stages. Text books, educational manuals, time tables and educational programs (schemes of work) which were in the main identical with Nigerian schools were prescribed for all schools in Cameroon (Fonkeng, 2005). The main objective of in their education policy planning was to train temporary civil servants for colonial exploitation, clerks to work in the administration, business, and plantation and security service.

Mission education was viewed as a means of spreading religion by training catechists, teachers, pastors, and clerks while Native Administration saw education as a means of serving ethnic groups, clans and villages (Ngoh, 1987). Education in British Southern Cameroons was dictated by the British Education Policy of for Nigeria (Tambo, 2003). In 1927, the Memorandum on the Place of the Vernacular in Native Education allowed the use of vernacular for instruction in the early stages of elementary education and English Language in intermediate, secondary and technical schools. Ngoh (1987) contends that the government reserved to itself the general direction of educational policy and the supervision of all instructions. The curriculum of elementary education included the teaching of hygiene, reading, writing, arithmetic, singing and religious instruction. The First School Leaving Certificate Examination was instituted. In 1932, the educational cycle was reduced from nine to eight years with education being financed from school fees, sale of produce from school farm, school manual labour, grants-in-aid from the Native Administrations, Government and mission funds.

According to Tamanji (2011), there were only six government schools serving as model schools, for example Government School Buea, Mamfe, Kumba, Bamenda, and Victoria. The British government had as a policy not to engage so much in education but to show how schools should be run. Ngoh (1987) posits that the most fundamental problem of education was lack of adequate qualified staff in schools. As solutions, the Government schools were reduced and teachers recruited from Nigeria, Britain and the West Indies. For the Native and Administration and Missionary schools, the shortage was handled by recruiting non certificated, assistant, probationary and vernacular teachers. An Elementary curriculum included first aid, agriculture, handicraft, music and games. Training Centre was opened at Kake for the training of elementary teachers in British Southern Cameroons (Tambo,2003; Ngoh, 1987). The number of students in 1939 was 33 and increased to 42 in 1940.

For secondary education policy planning, there was no college in British Southern Cemeroons by 1939 and all qualified British Cameroonians had to cross to Nigeria for further education. Ngoh (1987) holds that although there were an insufficient number of primary schools in British Southern Cameroons, the pupils performed far better academically that their Nigerian counterparts in school examinations. In 1939, the first secondary school was opened in Sasse in the Victoria Division by the Roman Catholic Mill Hill Missionaries. Another was opened at Bali about ten years later by the Basel Mission. In 1956, the first girls school Queen of the Rosary College was opened at Okoyong in Mamfe.

These secondary schools adopted the University of Cambridge School Certificate Examination syllabus as well as the West African school certificate examination syllabus. The exam was a grouped certificate examination in which students choose subjects from four basic areas: Language, Maths, Social Studies and Science. To obtain the certificate, you needed to have passed in a number of subjects selected from each of the four groups. The pass mark was calculated on the total score. It was based on the total score that you were classified as Grade II or III teacher. This system continued until 1955. After Independence, the Cambridge and West African School Examinations were replaced by the University of London General Certificate Examination (Kibinkiri, 2014). It should be noted that these colleges were opened by missionary bodies and not the British colonial administration.

Educational planning during the French and British Trusteeships (1946-1960/61)

The United Nations Organization was created at the end of the Second World War (1939-1945) to replace the League of Nations (Tambo, 2003). The United Nations was divided

into six organs, one of which was the Trusteeship Council that took over the supervision of the former mandated territories of the defunct League of Nations. Emphasis during this period with regard to educational policy planning was laid on post-primary and professional education in both the French and British administered sectors of Cameroon (Kibinkiri, 2014). From 1954, British Southern Cameroon became an autonomous region within the new Nigerian administrative arrangements created by the McPherson constitution. An independent board of education for the Southern Cameroon was set up in Buea.

Also, in French Cameroon, enrolment in primary education tripled but some emphasis was given to secondary and professional education which received significant financial assistance from the Colonial Development and Welfare Funds. This increased the number of secondary schools from one to four (Tambo, 2003). The main objective was to give the products of schools the skills of running the country's affairs. Consequently, there was great pressure for educational institutions to expand and for higher educational institutions to be created so as to train middle and higher level man power. Scholarships were expensive and the first University was created in Cameroon-the University of Yaounde in 1962. Also, the situation for general secondary school changed with the creation of the Advanced Teacher Training College Yaounde in 1961 with an annex created in Bambili in 1967.

Educational planning during the Post Independent Period (1961 to Present)

Post-colonial era in Cameroon education policy planning began with independence and then unification of the French Cameroon and British Southern Cameroon between 1960 and 1961 (Tambo, 2003). French Cameroon gained her independence from the French in 1960 while the regions under British control gained independence in 1961 and merged with Francophone Cameroon (Ngoh, 2006). The country then adopted French and English as the two official languages with equal status thanks to its dual colonial heritage based on the 1996 Constitution of the Republic of Cameroon. This prompted the emergence of Bilingual primary, secondary, higher education and teacher education institutions in the country. Worthy of note is the fact that the post-independence era was marked by three distinct periods starting from: the Federal period between1961 and 1972; the Unitary period between 1972 and 1982 to the Republic from 1982 to present. The period 1961 to 1982 was under Ahmadou Ahidjo as President of Cameroon (Ngoh, 2006). President Paul Biya took over from President Ahidjo in 1982 (Ngoh, 2006).

The major curriculum planning policies during the Federal period included the policies of Harmonisation, Ruralisation and Bilingualism. Cameroon/World bank Report (2012) holds that the country had one of the most effective education systems in Africa during the 1970s and 1980s (the unitary period). As national revenue declined, education development became uneven with periods of growth and decline, similar to the economy. This report further states that primary completion rate increased from 59 percent in 2004 to 72 percent in 2008, and that the repetition rate decreased from 22 percent to about 18 percent, respectively.

Moreover, Cameroon has remained stable since its unification in 1961. In the colonial era, education policy planning in terms of pedagogic resources was designed to serve colonial interest. In the years following the attainment of independence, it had to be oriented towards meeting the needs of national independence and development in all aspects of national life. The educational policy since independence emphasized the extension of educational opportunities to the entire population, the forging of national unity and man power development for economic, social, and political needs of the country. This is the period in which the government became more active in education. Primary and secondary schools expanded and the role of the Ministry of Education was supervisory so that there should be quality, standard and one curriculum or uniformity as seen from the different curriculum policies that were implemented.

1.1.2.2. Trends of Education policy planning for Teacher Training Colleges in Cameroon

Focusing on teacher training in Cameroon, the historical background depicts that formal training of teachers in Cameroon dates back to about 70 years. Schools in Cameroon during the pre-colonial and colonial eras were responding only to the needs of evangelisation and colonialism rather than education for national development. By the late 19th century therefore, the earliest kind of teacher education appeared in the training of individuals to teach the doctrines of various religions. Alfred Saker (1885) and the Roman Catholic Mission (1907) respectively provided such training in Douala. In these early days in French Cameroon, teacher education was carried out in the senior primary school in Yaoundé, which trained elementary school teachers. Early attempts to provide teacher education were by private endeavour. The first training college in Foulassi, was opened in 1925 near Sangmelima in the Dja-et Lobo by the Presbyterian American Mission with the objective to train teachers for the primary schools and for evangelisation. These teachers also served as community and religious leaders.

The policy of duration for the training was two and half years with one year spent for pedagogical activities and the rest for content, general culture and the Bible. With a high

demand for teachers, professional regional schools were opened in Ebolowa, Dschang, Ngaoundere, Garoua and Maroua, with an autonomous professional training centre in Douala (Fonkeng 2005). During this early beginning, the aims of teacher education and training were limited, reflecting the narrow aims of the schools for which they were trained. Schools were to provide basic skills in the 3Rs and other useful information. Since the colonial masters' main objective was to spread their culture and civilizations, teaching methods encouraged, lacked a scientific base, and this had implications for all training and teaching endeavours.

In the British part of Cameroon, the education policy planning made it possible for elementary teachers to be recruited from Nigeria (Ngoh, 1996). The first school for the training of teachers was opened in Victoria in 1922 but was later moved to Buea and renamed the Normal College. Between 1927 and 1931 four batches of students were admitted in the Normal College in Buea for a two years course. In 1932, the student teachers who had completed the first year in the Buea Normal College were transferred to Kake in Kumba. The implications here were two-fold, the need for more trained teachers and the need for new and comprehensive teachers for a rural society whose role would be diverse and multifarious. Such teachers were prepared for teaching in the lower primary classes. The three-year Teacher's Grade III was not terminal as it provided grounds for continuous development. Some of the successful Grade III teachers taught for a year and qualified for admission into a two-year higher elementary training course (Grade II) went to Nigeria. In some cases, they did a straight four-year course.

Further growth of teacher education was the institution of the Grade II course in Cameroon in 1945 at the Government Teacher Training College (G.T.T.C.) Kumba. From then onwards, more training colleges were opened by both the state and private initiatives for the training of Grade III, Grade II and even Grade I Teachers. The curriculum included courses for the professional development of the teachers, primary school subjects and subjects for specialist teachers such as manual arts, rural science, home economics, handicraft and woodwork. Grade I certificates were also awarded to candidates who after their courses obtained both "O" and "A" Level papers in the General Certificate of Education examination and passed in the practical teaching examination in either a secondary or teacher training classroom. More transformations in teacher education were introduced in the 1960s with the clearing off of pupil-teachers from the field. This was to ensure quality and also maintain job security for existing trained teachers. This led to the introduction of a five-year course leading to the award of a Grade II Teacher Certificate. Entry qualification was Primary School Leaving Certificate with a pass in the Common Entrance Examination. The first three years were for

personal development of the student teacher in secondary school subjects. The last two years were for professional development.

In educational policy planning, the pioneer president of the Republic of Cameroon Ahmadu Ahidjo emphasized the importance given to education and training of teachers in 1966 in his statement that Cameroon must undertake mass training of teachers worthy of their vocation; such masters must be supplied both in the particular subject given and where they are needed in any part of the country. For the English-Speaking Cameroon, a Teacher training college for girls was opened in Kumba by the St Franciscan Missionaries in 1949, awarding a Grade III and later Grade II certificates. In addition, another training college was opened in Mutengene for both men and women. Today what remains of these efforts is the Catholic teacher training college in Tatum in the present North West Region. The Presbyterian Teacher Training College (PTTC) Mbengwi was opened in 1981 for the training of Grade II teachers which is still existent.

The Baptist Mission through the support of the German Development Service (DED) opened a teacher training college for Grade I and II Teacher Certificates with boarding facilities in Ndop in 1985. Also, the German Development Service with financial support of the Protestant Association for Cooperation and Development operated in-service training programmes for academically qualified, but pedagogically untrained teachers in the Presbyterian and Baptist secondary schools in the North West and South West provinces as from 1994-1995 academic years. The programme was to improve skills in the teaching of Mathematics, the Pure Sciences and Food and Nutrition. This initiative provided school-based in-service training opportunities for their teachers.

For the French Speaking Cameroon, by 1956 there were only four private teacher training colleges in the whole territory, the first of which had been opened at Nkongsamba. Between 1957 -1958 the Lutheran Evangelical Church opened a college whose objective was to train teachers. Other strategies for training were adopted by the mission, leading to the opening of a centre in Ngaoundere in 1975 for the retraining of teachers. Also, higher education institutions unknown in colonial era were being established. The first higher teacher training college (the Higher Teacher Training College Yaounde) was created in 1961. There was greater collaboration between government and voluntary agencies. Parents began to play an important role in education through the Parent Teacher Association (PTA). By 1970, the Government had 1 primary teacher training college, while the missionary bodies had 11, making 92% of primary teacher training institutions owned by the missions (Fonkeng, 2005). Teachers in the public

institutions were considered as civil servants with their rights and duties specified and safeguarded by general statutes of the civil service (Fonkeng, 2005).

In West Cameroon, teacher training colleges prepared Grades I, II and III teachers, with Grade three the lowest qualification for trained teachers followed by Grade II and then Grade I which was the highest. The grade levels determined the salary scale. In East Cameroon, there was a considerable increase in the number of teacher training institutions with more complicated grading systems. The lowest Grade offered was the *Maitre Certifié* which was mainly for primary school teachers. Formal teacher training was offered in *Ecole Normale* with the fist created in Foulassi. They organized a four years course for primary graduates leading to the *Brevet Elémentaire* (Fonkeng, 2005*).* Other prospective teachers of the Lutheran schools were trained as private teachers in the then Government Teacher Training Colleges for all levels of the school systems as far back as 1972. Some of the teachers were trained in Senegal and France. The essence was to improve the quality of teachers at both the primary and secondary levels.

In 1988 the leaders of Protestant education in Francophone Africa created a group to reflect on pedagogic reforms for the purpose of ensuring more active participation of pupils in the learning process and relevant programmes that would facilitate the integration of pupils in their environment. The reflection led to the creation in 1989, of a school development network (Reseau Ecole et Development) known by the acronym, RED. The pedagogic reform to improve teacher's skills focused on the development of teaching methods that encourage independence and initiatives.

In addition to institutional offerings, the Catholic mission organized more school-base teacher training at diocesan level with the support of pedagogic animators. Teachers must participate in a number of sessions to qualify as teachers. Teacher education and training in Cameroon provided initial and in-service at all the levels in compliance with the presidential decree of 19th June 1980, structuring teacher education institutions and courses (Tchombe, 2000). Today, primary teacher training has been modified to train only Grade One teachers with number of years spent in training corresponding to the entry qualification for one year, two years and three years' programs.

The year 1995 saw the holding of the National Forum on Education that laid foundations for a new orientation in education policy planning as well. The result was Law No 98/004 of 14 April 1998 and later Law No 005 of 16 April 2001 on the new guidelines on

Higher education. Following these Laws, Cameroon has made tremendous education policy planning efforts to respond to the need for quality and the demands of Information and Communication Technology and Globalization. To add, this is the era in which ICTs are taking the centre stage in almost every sector of life in Cameroon. Scientifically as well as pedagogically, it is normal for an effective teacher to alter his or her strategies, methods and techniques of teaching and learning with the use of pedagogic resources.

Also, these pedagogic resources have changed since the era of the missionaries. It is worthy to note that dramatic changes that comes as a result of ICTs poses a great challenge to so many teachers as well as student teachers and consequently to all the stake holders. In fact, significant changes in ICTs and their penetration into the educational system are a growing concern in Cameroon and the world at large. It is an issue that concerns everybody irrespective of ethnicity, region or race. No one is excluded. ICTs have potentials to improve teaching and learning as well as harbours a threat to education if poorly used (Kibinkiri, 2014). In Cameroon today, this is compounded by a range of challenges faced by teachers especially in the basic education sector which is the focus of this study. Some of these challenges are the large numbers of learners, rapid change in technologies, increase accessibility, ownership, and use of these technologies by students in and out of school.

It is worthy to note that ICT through educational policy planning as a subject was only introduced in primary teacher education of recent and since then has been going through syllabus restructuring, which often do not tie with the expectations of the primary schools. Student teachers therefore leave school and plunge into the job marked, unable to operate ICT gadgets and let alone integrate them to teach lessons to pupils. It was only in 2013 that the New Syllabuses for Teacher Training Colleges was instituted by the Ministry of Secondary education that included subjects like ICT and Didactics of Educational Technologies through which student teachers will be drilled on the integration and operation of ICTs in pedagogy (MINESEC, 2013).

This new development however still faces several challenges ranging from the lack of qualified staff to handle the subjects, insufficient or near absence of equipment, poor ICT attitude of teacher trainers, poor attitude of learners, absence of a comprehensive national policy on the integration of ICTs to name these. This has led to ineffective handling of these subjects in the primary teacher training colleges and a consequent drop in the professional development of these 21st century teachers. This has motivated this researcher to evaluate the

implementation of the 2013 reform on the integration of ICTs in the teacher training colleges aimed at enhancing the professional development of primary student teachers in Cameroon.

1.1.3. Trends of ICT Planning in Education

According to Kain (2015) ICT history and revolutions in the field of education has experienced four stages or trends. In his view, the first phase according to Paisely (1985) cited in Kain (2015) was comprised of radio, television, films, and integration of satellite broadcasting, while the second phase comprised of microcomputers and telecommunication especially in mathematics teaching and learning. The third phase had to do with the integration of microelectronic technology and telecommunication in computing. This was called the Information Technology (IT) phase. And the fourth phase which is considered as the current trend brought along with it the inclusion of communication to Information Technology giving raise to Information and Communication Technology.

Furthermore, Kain (2015) consider the first face of ICT revolution as 'paper and pencil' way of teaching or instruction and delivery in which the teacher was the focal point or the main actor. The teacher during this phase was considered as the as the main if not the only source of knowledge in the classroom teaching and learning process. This style of teaching was later term as the "traditional" teaching style. In this style the available technology was only at the disposal of the teacher or instructor. This because the style was that of the teacher imparting knowledge to the learners and the role of the learners was to memorise the knowledge impacted and reproducing it when and where ever required. Therefore, technology in teaching at this phase was instructional technology though grossly limited to paper and pencil.

The second phase or trend of ICT revolution in education according to Kain (2015) is described by mathematical educators as the 'new' or modern phase. This phase is dominated by the explosion of the teaching of mathematics world-wide. In this phase calculators were introduced in the teaching learning process shortly followed by computers. This was to facilitate both the teaching and the learning process. There was a lot of focus on mathematics and the appropriateness of the methods of teaching. The introduction of technology in education or classrooms was to help eradicate elements of the "traditional" phase which laid emphasis on rote learning, making it difficult for long-term retention of knowledge and the development of skills. Modern methods of using technology in the teaching and learning processes equip learners with critical thinking skills and providing quick responses and expected solutions. Calculators and computers however were still considered by educators as

promoting rote learning as a button could just produce an answer. This phase of technology (ICT) in education is guided by constructivism but controversial in that learners could not create their own knowledge (Kain, 2015).

The third trend of ICT revolution in education according to Papagiannist et al (1987) cite in Kain (2015) was more promising in terms of individual productivity, problem solving, long life learning, quality of information, rational, participation, modernisation, and adapting to the network and web of the new generation electronic community worldwide. Kain (2015) consider this trend as influenced by the by the increasing financial and economic crisis in many countries throughout the world in the late 1980s and 1990s. This economic crisis caused economic growth stagnation and unemployment and computers as well as ICT tools set in to reduce cost and improve efficiency by replacing skilled paid jobs (Schurenky, 1997 cited in Kain, 2015). Kain (2015) states that with regard to education, introducing computers and other ICT tools in school curricula raised a series of worries in both develop and developing countries. There was fear of computers coming to replace teachers by becoming the basic instructional delivery system, create unemployment, and deprived learners of those essential skills computers could not transmit or construct.

The fourth trend of ICT revolution in education is known as the current trend and has as its foundation force globalisation (Kain, 2015). This trend has rapidly replaced the others and has accelerated and imposed its influence worldwide. McGrew (1992) cited in Kain (2015) states that globalisation has diverse descriptions with focus on the intensity of interconnectedness, which eliminate borders and enhance international transactions, exchanges and above all transnational interaction. It is refered by Wallerstein (1995) cited in Kain (2015) as the process of incorporating the world's peoples into a single global community or society. In education, this trend has brought about full-scale application of ICT tools in the instructional and learning process, and ICT has greatly influenced the development and delivery of school curricula.

Technology is today used in classrooms and education in general on seconds and minute bases. Kain (2015) holds that the availability of digital technology especially ICTs has permitted learners to interact with both teachers and technological tools and resources such as computers, whiteboard, phones, television, social media forums, and digital interactive educational forums. Learners in this globalised digital age through internet and computer network are able to communicate and share their views with their teachers on materials presented and studied from the comfort of their location. One of the greatest innovations of the

fourth trend is the exploitation of ICT tools for e-learning (online learning) and distance learning, physical mobility in education has been drastically reduced as education is increasingly being digitalised with 100% digital schools existing on the internet. This has facilitated teaching and learning as it can take place in or out of classrooms or campus. Education has greatly been globalised and facilitated.

1.1.4. Trends on ICT policy planning in Cameroon

Mbua (2002) defined educational policy as "the nature (rules and guidelines) of the provision of education by the Government." In fact, educational policy regulates and controls the conduct of the national educational system. It is the basis of day-to-day administration and serves as a guide to administrators when deciding the lines along which the educational system should be conducted. The main arguments for a sustained use of ICT in education in both developed and developing countries at the level of policy can be summarized as:

- Like literacy and numeracy
- IT is an essential life skill
- IT provides an opportunity for economic development and is a requirement for employability
- IT is a tool for educational management
- IT is a tool that can improve teaching and learning (OECD, 2001).

Jones and Kozma (2003) have stated that national ICT policies can serve several important functions. First, ICT policies provide a rationale, a set of goals and vision of how education system work and how to integrate ICT it into teaching and learning and how they can benefit students, teachers and the general population. Secondly, ICT policies are expected to provide guidance on implementation of ICT in education. National ICT policies for education can serve important functions and ―provide a rationale, a set of goals, and a vision for how education systems might be with the introduction of ICT, and how students, teachers, parents and the general population might benefit from its use in schools (Kozma, 2008).

National Policy for Information Technology in Cameroon: National Agency for Information and Communication Technology (ANTIC)

ANTICs' belief are that Information and Communications technology skills can be effectively applied to modernize and enhance teaching, learning and management, mobilize new support for education and provide the infrastructure for regional collaboration, cooperation

and the pooling of resources to unprecedented levels. This agency proposed the National ICT policy document used in Cameroon and some objectives were:

- Identification of ICTs as an enabler in achieving most of the activities identified in the Poverty Reduction Strategy Paper (PRSP) in 2003;
- Formulation of a sectorial strategy in the field of telecommunications and ICTs by the Ministry of Posts and Telecommunications in 2005.

Alongside these activities, several initiatives for the development and deployment of ICTs are underway within government departments in Cameroon as mentioned by the National Agency for Information and Communication Technologies (NAICT, 2007). These include:

- The formulation of a government action plan for an information and knowledge-based society by the Ministry of Scientific Research and innovation;
- The implementation of an ICT development programme by the Ministry of Higher Education;
- The creation of multimedia resource centres in secondary and high schools within the Ministry of Secondary Education;
- The implementation of the audio-visual sector liberalisation option by the Ministry of Communication;
- The implementation of the National Governance Programme by the Prime Minister's Office;
- The introduction of ICTs in the management of State personnel by the Ministry of the Public Service and Administrative Reform;
- The computerisation of the national identity card by the Delegation of National Security;
- The computerisation of the electoral process by the Ministry of Territorial Administration and Decentralisation.

These national initiatives are supported by other external initiatives, such as:

- The initiative of the Economic Commission for Africa (ECA) on defining the National Information and Communication Plan (NICI Plan);
- The UNDP initiative on an ICT policy in Cameroon within the framework of the Second Tokyo International Conference for African Development (TICAD II) ;
- The International Telecommunications Union (ITU) support to the formulation of MINPOSTEL sector strategy;

- Support to the development of community and rural radios by UNESCO.

Despite the positive impacts of these initiatives, the absence of broad-based consultation and coordination among various stakeholders during the formulation of these sectorial strategies and programmes of Ministries resulted in incoherent visions of the development of the ICT sector. These shortcomings prompted the development of a National ICT policy which reflects a single and coherent vision on ICT development that takes into account the convergence in technologies.

1.1.5. Evolution of students' Competence development.

Competence development has experienced changes or evolution worldwide. Elliot (2017) states that the importance of professional development clearly developed by the National Staff Development Council (NSDC) statement of 2001 requesting on teachers and educators to dedicate at least 25% (twenty five percent) of their allocated professional time to the activities that has to do with learning and collaboration. These are the foundation for developing students professionally. But on the other hand, Hill (2009) cited in Elliot (2017) states that the time educator focus on professional development goes below 25% of what is recommended by the NSDC. The guide is meant to make teachers to be current on issues of effective and efficient educational practices, and guide them in constructing students' knowledge and developing skills to meet up with the current trends.

Professional development's importance in education is given in-depth by Spanneut et al. (2012) cited in Elliot (2017) holds that professional development help teachers to attain needs, aims, goals and objectives of the students. Also, Spanneut et al. (2012) cited in Elliot (2017) states that the views of school administrators (educational administrators) on professional development have greatly affected the progress of professional development in educational structures and institutions. This view has overtime been affected by socio-political and professional factors, theories of learning, effective professional development features, and in this technological digital age by electronic educational models which guide online professional development.

Elliot (2017) states that the changes in the trends of the political and professional impact on the thoughts and evolution of professional development over the past five decades (fifty years), in the direction of meeting school and educational demands that are most important and pressing. These trends of changes in thoughts according to Katz (2010) cited in Elliot (2017) originated or is borne from governmental moves to resolve the current shortcoming and

ineffectiveness of the educational system as a whole, not taking into strict consideration the views of the affected communities. This was often carried out with the underlining objectives of innovative initiatives, with the vision of providing equitable and accessible educational opportunities to all children and citizens while increasing the general quality of education in the whole educational system (Elliot, 2017).

In the USA, Elliot (2017) states that the CCSS (Common Core State Standards) was put in place as an initiative to overcome the shortcomings perceived in the educational system with focus on professional development. There were also other initiatives like NGA (Center National Governor's Center for Best Practices) and CCSSO (the Council of Chief State School Officers) were other key initiatives introduce to ensure best practices and also collectively created to support the Common Core Standards (CCSS) so that they could collectively achieve the consistency when it comes to national professional development in the educational sector. CCSSI (Common Core State Standards Initiative) created in 2009 along the Council of Chief State School Officers. At creation CCSSI stated in 2009 that they are focused on an effective and consistency standard in professional development and in the educational sector in general from the perspective of higher order evidence-based standards; this standard facilitated the United States and other American territories to function on a standard level base.

Also, Arends (2014) in Elliot (2017) explain why modern historical trends of programs related to professional development is more focus in taking into consideration the professional needs in the course of design, planning, and implementation processes as recommended. Furthermore, the best and most effective instructional activities are based on a system that is founded on the most effective and efficient learning theories used in the processes of selecting and designing professional development programs especially for those in the instructional field in education (Desimone and Garet (2015) in Elliot (2017). This is because the product of the educational system in terms of professional development quality is determined by the professional quality of the teachers and lecturers. This is why most countries in the world have evolved to the level of making use of teachers and lecturers with an instruction professional background.

Furthermore, Zemke and Zemke (1995) in Elliot (2017) also establish the influence of learning theories on the evolution of professional development in the educational sector, of which defined it as the acquisition of knowledge and skills through study or instruction. The definition of Zemke and Zemke (1995) according to Berg-Sorensen et al. (2010) in Elliot (2017) apply to a number of learning approaches that are of broad spectrum, beginning from

essentialism to constructivism theories of learning. While this view is strongly supported by Haythornthwaite and Andrews (2011) who state that a sound, effective and efficient education has as basis a sound, effective and efficient learning theory, irrespective of whether it is in a traditional classroom or online. This follows the trends of professional development in the educational sector with the exploitation of modern technologies, especially digital.

Effective professional development features have been considered to be very instrumental in the evolution of professional development in the educational sector. For this reason, Hein (2008) in Elliot (2017) argue that lecturer's (teacher's) attitudes and skills are influence by the effectiveness of professional development, which will result in an improvement in the quality of education from a professional development perspective. On the other hand, Beavers (2009) in Elliot (2017) examine the evolution of professional development from the perspective of giving lecturers giant opportunity for collaborating and developing new experiences, ideas and approaches from their peers on developing students professionally, irrespective of being separated by lecture halls significantly. Professional development organizers in the educational sector according to Elliot (2017) are more oriented towards earning professional development credit as one of the conditions for the retention of teaching certification, rather than considering it as lifelong learning process as a lecturer, teacher or educator.

Table 01: The structure of Government Teacher Training College of the two systems

English Sub System					French Sub System				
Entry qualification	Duration in school	Certificate	Level	Classes	Entry qualification	Duration in school	Certificate	Level	Classes
GCE Ordinary level (4 above)	3yrs	Grade I	1,2,3	1	BEPC	3yrs	CAPIEMP	1,2,3	BEPC 1:Year 1 BEPC 2:Year 2 BEPC 3:Year 3
GCE O'L and GCE A'L Paper	2 years	Grade I	1, 2	2(2A,2B,2C)	PROP	2yrs	CAPIEMP	1,2	Prop 1:Year 1 Prop 1:Year 2
GCE Advanced level	1year	Grade I	3	3(3A,3B,3C)	BAC	1yr	CAPIEMP	3	BAC A or BAC B BAC C

Table 1 above shows that the English and French sub systems programs have been harmonised. Students with same entry qualification spend the same duration in school. A student with O'L

in the English sub system enters class one (1), the second year he/she moves to 2A,2B 2C and finally to 3A,3B ,3C. However, the nomenclature changes in the French Sub-System where the classes are attached to entry qualification.

1.2.0. CONTEXTUAL BACKGROUND

1.2.1. Cameroon

Cameroon extends over to the west, central and Sahel regions of Africa. Its coast line is watered by the Atlantic Ocean. While its interior is characterized physically by vast plains as well as highlands. Cameroon experiences a variety of climatic conditions. The coastal and lowland areas experience high temperatures and heavy rainfall, the hinterlands have lighter rainfall and low temperatures in the high lands. The different climatic conditions and vegetation propel several human activities. Administratively, the republic of Cameroon is divided into ten regions, fifty-eight divisions, three hundred and sixty sub divisions and fifty-three districts. Cameroon covers an area of 475000 square km. it has 27,412,055million people. Cameroon highest mountain is mount Fako with 4100m is the highest mountain while the longest river is river Sanaga and others are river Mungo, Logone, Shari. It has two main vegetation: - the equatorial forest and the tropical grassland.

1.2.2. The History of Teachers Training Colleges in Cameroon

To better understand the context of ICT reforms and primary teacher education in Cameroon, it is important to begin with an evolutionary summary of teacher education in the country. The formal training of teachers in Cameroon is a phenomenon that dates back to about 70 years. Schools in Cameroon during the pre-colonial and colonial eras were responding only to the needs of evangelisation and colonialism rather than education for national development. By the late 19th century therefore, the earliest kind of teacher education appeared in the training of men to teach the doctrines of various religions.

Alfred Saker (1885) and the Roman Catholic Mission (1907) respectively provided such training in Douala. In these early days in French Cameroon, teacher education was carried out in the senior primary school in Yaoundé, which trained elementary school teachers. Early attempts to provide teacher education were by private endeavour. The first training college; Foulassi, was opened in 1925 near Sangmelima in the Dja-et Lobo by the Presbyterian American Mission with the objective to train teachers for the primary schools and for evangelisation. These teachers also served as community and religious leaders. The duration of the training was two and half years with one year spent for pedagogical activities and the

rest for content, general culture and the bible. With a high demand for teachers, professional regional schools were opened in Ebolowa, Dschang, Ngaoundere, Garoua and Maroua, with an autonomous professional training centre in Douala (Fonkeng 2005).

From the aforementioned during this early beginning, the aims of teacher education and training were limited, reflecting the narrow aims of the schools for which they were trained. Schools were to provide basic skills in the 3Rs and other useful information. Since the colonial masters' main objective was to spread their culture and civilizations, teaching methods encouraged, lacked a scientific base, and this had implications for all training and teaching endeavours. In the British part of Cameroon, elementary teachers were first recruited from Nigeria (Ngoh, 1996). The first school for the training of teachers was opened in Victoria in 1922 but was later moved to Buea and renamed the Normal College.

Between 1927 and 1931 four batches of students were admitted in the Normal College in Buea for a two years course. In 1932, the student teachers who had completed the first year in the Buea Normal College were transferred to Kake in Kumba. The implications here were two-fold: (1) the need for more trained teachers and (2) the need for a new and comprehensive teacher for a rural society whose role would be diverse and multifarious. These teachers were prepared for teaching in the lower primary classes. The three-year Teacher's Grade III was not terminal as it provided grounds for continuous development. Successful Grade III teachers taught for a year and qualify for admission into a two-year higher elementary Training Course (Grade II) some of whom went to Nigeria. In some cases, they did a straight four-year course.

Further growth of teacher education was the institution of the Grade II course in Cameroon in 1945 at the Government Teacher Training College (GTTC) Kumba. From then onwards, more training colleges were opened by both the state and private initiatives for the training of Grade III, Grade II and even Grade I Teachers. The curriculum included courses for the professional development of the teachers, primary school subjects and subjects for specialist teachers such as manual arts, rural science, home economics, handicraft and woodwork. Grade I certificates were also awarded to candidates who after their courses obtained both "O" and "A" Level papers in the General Certificate of Education examination and passed in the practical teaching examination in either a secondary or teacher training classroom.

More transformations in teacher education were precipitated in the 1960s with the clearing off of pupil-teachers from the field. This was to ensure quality and also maintain job

security for existing trained teachers. This led to the introduction of a five-year course leading to the award of a Grade II Teacher Certificate. Entry qualification was Primary School Leaving Certificate with a pass in the Common Entrance Examination. The first three years were for personal development of the student teacher in secondary school subjects. The last two years were for professional development.

The importance given to education and training of teacher was emphasized by the pioneer President Ahmadu Ahidjo of Cameroon in 1966 who reiterated in the statement; "Cameroon must undertake the training en masse of teachers who are worthy of their vocation; such masters must be supplied both in the particular subject given and where they are wanted, in whatever part of the country that may be". For the English-Speaking Cameroon, a teacher training college for girls was opened in Kumba by the St Franciscan Missionaries in 1949, awarding a Grade III and later Grade II certificates. In addition, another training college was opened in Mutengene for both men and women. Today what remains of these efforts is the training college in Tatum in the present North West Region.

Also, the Presbyterian Church had three teacher training colleges opened since 1966, only Presbyterian Teacher Training College (PTTC) Mbengwi opened in 1981 for the training of Grade II teachers now exists. The Baptist Mission through the support of the German Development Service (DED) opened a teacher training college for Grade I and II Teacher Certificates with boarding facilities in Ndop in 1985. Other than these, DED through the financial support of the Protestant Association for Cooperation and Development (EZE) initiated in-service training programmes for academically qualified, but pedagogically untrained teachers in the Presbyterian and Baptist secondary schools in the North West and South West provinces as from 1994/1995 academic year. The programme was to improve skills in the teaching of Mathematics, the Pure Sciences and Food and Nutrition. This initiative provided school-based in-service training opportunities for their teachers.

For the French Speaking Cameroon, by 1956 there were only four private teacher training colleges in the whole territory, the first of which had been opened at Nkongsamba. Between 1957 /1958 the Lutheran Evangelical Church opened a college whose objective was to train teachers. Other strategies for training were adopted by the mission, leading since 1975 to the opening of a center in Ngaoundere for the retraining of teachers. Other prospective teachers of the Lutheran schools were trained as private teachers in the then Government Teacher Training Colleges for all levels of the school systems as far back as 1972. Some of the teachers were trained in Senegal and France. The essence was to improve the quality of teachers

at both the primary and secondary levels. In 1988 the leaders of Protestant education in Francophone Africa created a group to reflect on pedagogic reforms for the purpose of ensuring more active participation of pupils in the learning process and relevant programmes that would facilitate the integration of pupils in their environment.

The reflection led to the creation in 1989, of a school development network (Reseau Ecoleet Development) known by the acronym, RED. The pedagogic reform to improve teacher's skills focused on the development of teaching methods that encourage independence and initiatives. In addition to institutional offerings, the Catholic mission organized more school-base teacher training at diocesan level with the support of pedagogic animators. Teachers must participate in a number of sessions to qualify as teachers. Teacher education and training in Cameroon provided initial and in-service at all the levels in compliance with the presidential decree of 19th June 1980, structuring teacher education institutions and courses (Tchombe, 2000). Today, primary teacher training has been modified to train only Grade One teachers with number of years spent in training corresponding to the entry qualification for one year, two years and three years programs.

Table 02: Evolution of Type, Duration, Category of teacher training college

BEFORE 1999 **AFTER 2000**

Level of Education	Teaching type	Entry qualification	Course Duration	Category	Level Education	Teaching type	Entry Qualification	Course Duration	Category
NURSERY AND PRIMARY	Teacher Grade 1(e.n.i) Teacher grade 2 (e.n.i)	1)TWO A'LEVEL 2)ONE A'LEVEL	9 Months Two Years	B1	Nursery and Primary Education	Grade 1	GCE O'LEVEL GCE A'LEVEL (1PAPER) GCE A'LEVEL	3YEARS 2YEARS 1 YEARS	B2
		1)FSLC 2)THREE OR FOUR O'LEVELS	3 Years 9 months						
POST PRIMARY	Teacher grade 1(ENIET) Teacher grade 2 (ENIET)	AS ABOVE							

Source: Tchombe (2000)

As seen in the table 2 above, the primary teacher training evolved over the years in terms of its category, type and duration of schooling. The years before 1999 it was placed at category B1 and has improve to category B2 after the year 2000. The number of years students spend in the college depends on their entry qualifications for example with the Cameroon General Certificate, Ordinary levels (GCE Levels) student spend 3 years whereas with GCE A'LEVEL, they spend just one year. Table 2 also shows that there have been continues efforts to improve teaching and learning in teacher training colleges since 1999. Today a lot of adjustments have been made notably the implementation of competence Based Approach (CBA) which goes a long way to insist on the use of ICTs in teacher training process.

1.2.3. Information and Communication Technologies (ICTs) in Cameroon's Teachers Training Colleges

The education sector planning policy in Cameroon is plagued by policy issues on the integration of ICTs in pedagogy. Private schools in Cameroon introduced ICTs into their curricula in the 1990s, while public schools came in a decade later. But there was no specific policy guiding the teaching or use of ICTs in education, which lead to each school applying its own teaching method or program (Josué, 2007). The 1995 forum on Education which aimed at improving on the educational system however, mentioned nothing about the use of ICTs in the classroom. The orientation Law, Law No. 98/004 of 14th April 1998 to Lay Down Guidelines for Education in Cameroon on its part, did not make any direct mention of ICT in education. In his February 2001 address to the youths, the President, Paul Biya called on them to embrace the knowledge economy (République du Cameroun, 2007a). He promised the introduction of computing in schools and the endowment of computer rooms to schools.

In 2002, the speech gave birth to the introduction of ICT in secondary general and technical schools (Mbangwana, 2008). In 2003, official programs for ICT were designed for secondary schools (ERNWACA-Cameroon, 2005). In 2007, the Ministry of Basic Education developed a strategy for the implementation of the National ICT policy in Basic Education over 2007 and 2015. It included inter alia, training in ICT for teachers and school directors, and the integration of ICT into the curriculum (République du Cameroun, 2007b). The document further drafted the national guidelines for teaching ICT in pre-school and primary schools, with six different modules adapted to each level, from discovery and presentation skills to applying skills to knowledge construction, learning health and safety issues related to the use of ICTs. The teacher modules included productivity and research, applying ICT to

teaching and learning, evaluation, social, moral and human questions related to ethics and equality (République du Cameroun, 2007b).

The Cyber Education project was launched by the Government, targeting two sectors: secondary and tertiary education. Major achievements include the establishment of multimedia resource centres (MRCs) in universities, professional and technological schools, and some government secondary schools; training monitors to manage the MRCs; creating learning platforms; interconnecting the six state universities by then and establishing training units in professional schools and universities (Josué, 2007). This however did not extend to teacher training colleges in charge of training teachers for the basic education sector.

With a profound desire to enhance the professional development of student teachers to suit the 21st century standard of constructivist learning, and promote the Head of State's vision to integrate ICTs in pedagogy, the Ministry of Basic Education (MINEDUB) ordered a diagnostic study conducted by Marguerite Altet, a French Centre for Educational Research (CIEP) expert, and published in 2011 highlighting numerous pedagogic short-comings that needed to be addressed for student teachers to develop professional competences. Among these was the absence of a sound curriculum, lack of synchronized programming of pedagogic activities (Practicum), and inadequate training as concerns the different pedagogic reforms implemented in Basic Education (MINESEC, 2013).

From this crucial diagnosis, the Ministry of Secondary Education came up with new syllabuses for teacher training colleges in 2013 with a view to improve on the quality of teacher training for our basic educational system (MINESEC, 2013). Didactics of Educational Technologies and Information and Communication Technology (ICT) were two important subjects included in this new reform. The goal of these two subjects was to groom student teachers develop competences in computer awareness, such that they can effectively teach ICT and integrate ICT tools to teach all other subjects on the primary school curriculum. These new syllabuses based on the Competency-Based Approach using life skills were meant to prepare student teachers with the help of pertinent teaching-learning approach, to integrate in the world and confront a job market that is becoming more and more demanding (MINESEC, 2013).

This reform still needs to have the desired effect since most of our teacher trainers still lack fundamental skills in ICT to be able to implement this reform. Ngoungouo (2017), in a study on the use of ICTs in the Cameroon school system found that very few teachers are trained on using ICTs for teaching purposes. Only 14.28% of the respondents in his study

received training to teach using ICTs, while 85.75% did not. These teachers had received training on typing, internet-based research, online learning platforms, course projections and the use of computers on their personal initiative, not pre-service or in-service training. Nkwenti (2012) supports in a presentation on ICT in the School Curriculum that since 2008 when the first official syllabus for ICT in Teacher Training Colleges went operational, only 1.2% of in-service teachers have been trained on the practical use of ICT though 67.2% have theoretical skills through pedagogic day trainings. Only 33% frequently use the computer with 29% of these doing so out of school milieu.

The educational system in Cameroon has undergone many changes that have affected teacher education. It has no doubt witness a cycle of crisis arising notably from inadequacy of the system generally, the problem of harmonizing two inherited systems (francophone and Anglophone) and the issue of bilingualism. Anglophone and francophone Cameroon saw teacher education from different perspectives. Anglophone teacher education lay emphasis on the professional training of teachers institutionally, whereas its francophone counterpart believes more in training at the job. (Tambo and Ndongko, 2002). The harmonization of the two systems of education that differ in the languages used for instruction, structure, programs, content, depth, examination styles, method of personnel management and of administration has posed problems for teacher education.

1.2.4. Actual Situation of Teachers in general and ICTs teachers particularly in Teacher Training Colleges in Cameroon

This is an indication that the level of training on the integration of ICTs in pedagogy and the actual use of ICTs in our teacher training colleges remains problematic. The issue of teacher quality is further highlighted by the UNICEF Cameroon Country Programme (2018-2020) strategy note document that Inspectors and Supervisors don't provide teachers with regular, quality pedagogical support. This supposes that teachers function basically with their knowledge and skills acquired during training or privately. If their training was insufficient, they will not also stand the chance of being scaffolded by their pedagogic supervisors and inspectors, especially when it comes to the integration of ICTs in pedagogy.

Table 03: The training of ICT teachers to be used in schools

Teacher training colleges that train ICT teachers	N0 of trained ICT teachers				
	2015	2016	2017	2018	2019
HTTTC KUMBA			53	53	47
HTTTC Maroua			55	46	44
HTTT Betoua			50	52	42
HTTTC Bamenda			56	45	51
HTTC Bamenda			50	41	42
HTTC YAOUNDE 1	71	116	78	81	98
Total			342	318	324

Source: Fieldwork 2019/2020

Table 3 above shows that ICT teachers are grossly insufficient. In 2019 for example only 324 ICT teachers are trained to teach in thousands of technical, general and commercial Colleges in secondary and primary teacher training colleges in Cameroon.

Table 04: showing insufficient number of seminars and workshops in ICTs 2019-2020 School Year, North West Region

Activities carried out within the Region	Level of understanding of the contents	Level of appreciation of the methodology by the Actors	Difficulties faced	Attempted Solutions	Suggestions
Training of Supervisors on the Elaboration of Schemes of work and instructions on assessments	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Difficult training conditions like the lack of training halls, projectors and sound system making training not quite effective	Negotiating Halls other services and hiring equipment	Provide enough means for efficient and effective continuous pedagogic training
Training of Supervisors on the Elaboration or the stating of competence – integrated themes or complex situations	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Lack of textbooks adapted to the new curricula	Teachers use both primary and secondary sources to prepare and teach their lessons.	Provide Pedagogic supervisors with adequate material on the New Curriculum (The New Syllabuses, the guides and Textbooks
Training teachers and pedagogic supervisors on assessment and the filling of report cards following the New Curricula	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Appreciable but the practice is reduced to few functional schools and teachers in these schools	- Internalization of training very slow as most teachers have not been practicing for quite some time	Team and group work was encouraged amongst teachers	To reorganize and increase the number of pedagogic training to cover the whole region when peace return.
Pedagogic Follow-up (class and school visits, counseling etc)	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Appreciable but the practice is reduced to few functional schools and teachers in these schools	Generalized difficulty in carrying out school visits, Counseling and systematic Inspection due to insecurity in the	Few supervisors were assisted. The supervisors were encouraged to carry out proximity follow up	Resolve the long pending security challenges in the region to ease activities
Follow up of teachers and supervisors	- Region	- Region	- Region	Where it was possible	

Source: Fieldwork (2020)

It is observed in the table above that out of the many seminars carried out in 2019/ 2020 in the North West region that only one seminar and no workshop was carried out to ameliorate ICT pedagogy within two years.

1.2.5. Insufficient Infrastructures for ICTs Pedagogy.

As a consequence of policy issues, our educational sector is plagued by infrastructural insufficiencies and managerial inefficiencies that do not favour the integration of ICTs in the teaching-learning process. The National Institute for Statistics (2010) research report holds that only 2.5% of primary schools have a functional computer for learners with most of such schools located in urban areas while for secondary schools, 13% of schools in urban areas and 53% in rural areas do not have functional computers at the disposal of students. Rural areas have 90% of their schools not having electricity. The report further states that only 0.3% of the schools can afford solar panels while only 0.8% have electrical generators, most of which do not function regularly.

This makes the use of ICTs, mostly driven by electricity difficult, if not impossible in most schools. Nkwenti (2012) supports this ICT infrastructural problem by stating that only 3% of public schools have access to computers with only 1.2% having internet connection as seen on table1. This makes 90% of ICT lessons theoretical. This is supported by Ngoungouo (2017), who revealed that 100% of the teachers who used ICTs to teach in his study used their personal ICT tools (computers, tablets, data storage tools, internet) for teaching due to lack of these facilities in schools. Nkwenti (2012) further holds that only the Centre and Littoral Regions have up to 50 schools with computers with only Littoral Region having up to 10 Sub-Divisional Inspectorates with computers by 2011 as seen on table 5 below.

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Paix - Travail - Patrie

MINISTERE DES ENSEIGNEMENTS SECONDAIRES

DELEGATION REGIONALE DU CENTRE

DELEGATION DEPARTEMENTALE DU MFOUNDI

ECOLE NORMALE D'INSTITUTEURS DE L'ENSEIGNEMENT GENERAL BILINGUE DE YAOUNDE

SERVICE DES ETUDES ET DES STAGES

B.P. : 4306 Tél. : 222 21 13 77

Table 05: ICT laboratory Time Table

REPUBLIC OF CAMEROON
Peace - Work – Fatherland

MINISTRY OF SECONDARY EDUCATION

REGIONAL DELEGATION FOR THE CENTRE

DIVISIONAL DELEGATION OF MFOUNDI

GOVERNMENT BILINGUAL TEACHER TRAINING COLLEGE

OFFICE IN CHARGE OF STUDIES AND INTERNSHIP

P.O. BOX : 4306 Ph. n° : 222 21 13 77

EMPLOI DU TEMPS INDIQUANT L'ORDRE DE PASSAGE DES CLASSES DANS LA SALLE INFORMATIQUE ET LES PROFESSEURS ENCADREURS

	LUNDI	MARDI	MERCREDI	JEUDI	VENDREDI
PROBATOIRE II	M. YONKEU MBIAMI MME AYO Valery (10h30-11h30)				
BACC B	M. YONKEU MBIAMI Mme AYO Valery (12h15-13h15)				
BEPC III				Mme Bibani Mekinda Isis (14h30-15h30)	
BACC A	Mme BIBANI MEKINDA Isis (15h30-16h30)				
PROBATOIRE I			Mmes APOH – BIBIANI – ZOCK (10h30-11h30)		
BEPC II			M. YONKEU MBIAMI (11h30-12h15)		
BEPC I		Mme BIBANI MEKINDA Isis (14h30-15h30)			

Source: Fieldwork 2019

Table 5 above shows that ICT and DET are taught in colleges. As seen in the table there are laboratory centers in some training colleges but these centers do not have qualified personnel, enough computers and internet connection. As a result, more of theoretical than practical training takes place

Every academic year, we have thousands of student-teachers entering the various primary teacher training colleges for training. Even though the number fluctuates over the years, it is evident that this high turnout requires corresponding increase in ICT infrastructure in the respective schools if training on the integration of ICTs must be effective. It also requires an increase in the number of trained teacher trainers to handle this integration process in these colleges. Table 6 shows a total of 10, 797 and 11,390 students enrolled for 2017/2018 and 2018/2019 school years respectively. If the training on the integration of ICT is not effective, thousands of graduate primary school teachers will be sent out without sufficient skills in the integration of ICTs in pedagogy. Table 6 below shows a total of 9,133 and 7,147 student teachers who succeeded the end of training Certificate Examination for Nursery and Primary School teachers (CAPIEMP) for 2017 and 2018 sessions ready for the job market. The policy on the effective integration of ICTs in pedagogy with the provision of ICT- related infrastructure that matches the number of candidates needs thus to be emphasized to ensure the training of student-teachers with 21st century skills.

Table 06: Number of Successful Candidates at End of Training Certificate Examination (CAPIEMP)

CAPIEMP REGIONAL RESULTS	2012	2013	2014	2015	2016	2017	2018	Total
Adamawa	603	874	672	673	467	96	75	4160
Centre	2542	3491	2701	3004	2226	883	197	17044
East	539	736	631	615	379	96	77	573
Extreme North	1331	1566	1400	1722	1326	268	326	9939
Littoral	985	1294	1058	987	778	69	32	6103
North	787	1034	981	1130	996	99	77	6304
North West	2543	2683	1813	2203	2066	238	14	13260
West	2015	2373	2168	2011	1473	260	71	12271
South	974	942	884	860	631	45	70	5306
South West	1618	1703	1222	1242	983	79	08	8255
Total	13937	16696	13530	14447	11325	133	147	86215

Source: MINESEC (2019)-Secretariat of State to the Ministry of Secondary Education in Charge of Teacher Training Statistics Archive.

1.2.6. Teaching and learning of ICTs in Teacher training Colleges.

The UNICEF Cameroon Country Programme (2018-2020) strategy note document contends that the education system is plagued by a weak financial and management system, inefficient planning, lack of accountability and transparency. This is probably the reason for unavailability and non-implementation of educational programs that will promote the use of ICTs in the teaching-learning process. The UNICEF Cameroon Country Report in its introductory statement holds that since management of the education sector is shared by five ministries, advocacy for and the formulation and coordination of policies is constantly challenging.

They further noted that overcrowded classrooms with an average of 76 students for every teacher and insufficient instructional materials which forces learners to share basic resources, like textbooks are some of the obstacles to quality education. This is a similar scenario with schools that are able to afford a few ICT facilities like computers. The context in which our Teacher Training Colleges and primary schools find themselves makes the effective integration of ICTs in the teaching-learning process problematic.

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Table 07: Conducive environment for effective implementation of ICT pedagogy in TTC

REPUBLIC OF CAMEROON
Peace - Work – Fatherland

MINISTRY OF SECONDARY EDUCATION

REGIONAL DELEGATION FOR THE CENTRE

DIVISIONAL DELEGATION OF MFOUNDI

GOVERNMENT BILINGUAL TEACHER TRAINING COLLEGE

OFFICE IN CHARGE OF STUDIES AND INTERNSHIP

P.O. BOX : 4306 Ph. n° : 222 21 13 77

NOTE DE SERVICE N°_____/19/20/NS/MINESEC/DRES-CE/DDES-MF/ENIEG-B YAO Portant planification des activités du troisième trimestre de l'année scolaire 2019/2020

SERVICE NOTE N°____/19/20/NS/MINESEC/DRES-CE/DDES-MF/GBTTC YAOUNDE Showing the calendar of activities of third term for 2019/2020 school year

	ACTIVITES/ACTIVITIES	PERSONNES CONCERNEES/ PERSONS CONCERNED	DATES	LIEU/PLACE	OBSERVATIONS/REMARKS
	Assemblée générale **General Assembly**	Staff administratif, Professeurs, élèves-maîtres **Administrative/teaching staff and student-teachers**	28/05/2020	ENIEG B/ **GBTTC**	A partir de 10 heures **As from 10 am**
	Rentrée du troisième trimestre **Beginning of third term**	Staff administratif, Professeurs, élèves-maîtres **Administrative/teaching staff and student-teachers**	01/06/2020	ENIEG B/ **GBTTC**	
	Tenue des conseils d'enseignement **Holding of departmental council Meeting**	Animateurs pédagogiques, chefs de départements, professeurs **Pedagogic animators, heads of departments, teaching staff**	04/06/2020 04th /06/2020	ENIEG B/ **GBTTC**	

Source: Researcher's Computation (2020)

REPUBLIQUE DU CAMEROUN
Paix - Travail - Patrie

MINISTERE DES ENSEIGNEMENTS SECONDAIRES

DELEGATION REGIONALE DU CENTRE

DELEGATION DEPARTEMENTALE DU MFOUNDI

ECOLE NORMALE D'INSTITUTEURS DE L'ENSEIGNEMENT GENERAL BILINGUE DE YAOUNDE

SERVICE DES ETUDES ET DES STAGES

B.P. : 4306 Tél. : 222 21 13 77

Table 08: Conducive environment for effective implementation of ICT pedagogy in TTC

REPUBLIC OF CAMEROON
Peace - Work – Fatherland

MINISTRY OF SECONDARY EDUCATION

REGIONAL DELEGATION FOR THE CENTRE

DIVISIONAL DELEGATION OF MFOUNDI

GOVERNMENT BILINGUAL TEACHER TRAINING COLLEGE

OFFICE IN CHARGE OF STUDIES AND INTERNSHIP

P.O. BOX : 4306 Ph. n° : 222 21 13 77

EMPLOI DU TEMPS DU CHEF S.E.S. ANNEE SCOLAIRE 2019-2020

Madame NGA'OWONA Christiane Angèle Nicole épse BELINGA

<table>
<tr><th>JOURS
HORAIRES</th><th>LUNDI</th><th>MARDI</th><th>MERCREDI</th><th>JEUDI</th><th>VENDREDI</th></tr>
<tr><td>7h 30 – 8h 30</td><td>Visite des classes</td><td>Visite des classes</td><td>Visite des classes</td><td>Did. Maternelle (BEPC 2)</td><td>Visite des classes</td></tr>
<tr><td>8h 30 – 9 h 30</td><td>Travail administratif</td><td rowspan="3">Travail administratif</td><td rowspan="3">Travail administratif</td><td>Supervision pédagogique (BEPC 2)</td><td rowspan="3">Travail administratif</td></tr>
<tr><td>9h 30 – 10 h 30</td><td>Initiation à la recherche-action (BACC A)</td><td rowspan="2">Réunion avec les Animateurs Pédagogiques et les Chefs de Département</td></tr>
<tr><td>10h 30 – 11 h 30</td><td>Réunion de coordination administrative</td></tr>
<tr><td>11h 30 – 12 h 15</td><td>Pause</td><td>Pause</td><td>Pause</td><td>Pause</td><td>Pause</td></tr>
<tr><td>12 h 15 – 13 h 15</td><td rowspan="3">Travail administratif</td><td rowspan="4">Travail administratif</td><td rowspan="4">Travail administratif</td><td>Supervision pédagogique (BEPC 3)</td><td>Did. Maternelle (BEPC 3)</td></tr>
<tr><td>13 h 15 – 14 h 30</td><td rowspan="3">Travail administratif</td><td rowspan="3">Travail administratif</td></tr>
<tr><td>14 h 30 – 15 h 30</td></tr>
<tr><td>15h 30 – 16h 30</td><td>Supervision pédagogique (BACC B)</td></tr>
</table>

Source: Researcher's Computation (2020)

Table 08 above shows a well-structured system where there is collaboration and division of labor at one level to another in teacher training colleges. This enabling environment favours effective implementation and follow up of ICT programs. Calendar of activities are well prepared at the beginning of every year and term for the college. The Dean of studies has a well-defined follow up program for all activities of the school. However, a scenario is observed where regional inspectors are not really able to follow up activities in teachers training colleges the same way he or she does in secondary schools as expected because they complain that the course outline of ICT in teacher training colleges rather reflects the primary school and are not accustom with their program. Even when the Regional Inspectors for Information and Communication Technologies in the regions organize seminars for all schools, teacher trainers benefit very little because they are always based on secondary school program.

Section 9.- *At the end of each term, the school administration shall organise a session of pedagogic follow-up activities including the following:*

(1) An analysis of the results for each class, in a council meeting presided over by the principal/Head Teacher or any top-ranking official in the school. This meeting shall be an opportunity to assess the following aspects:

- *the coverage rate of the class teaching periods in relation to the school year;*
- *the coverage rate of syllabi with regard to the school year;*
- *the attendance rate of the students/pupil;*
- *the coverage rate of practicals in laboratories specialised halls and workshops in light of annual estmates;*
- *the success rate per subject;*
- *the class average;*
- *the rate of comprehensive development of nursery school pupils*

(2) The organisation of a Pedagogic Day to analyse the results per class and per level, to set objectives and map out strategies for improvement.

The minutes of these meetings as well as teaching period follow-up forms shall be forwarded as follows:

- *for nursery and primary education, to the Sub-Divisional Inspectors, who shall each forward a summary thereof within eight days to their respective*

Extract 1: MINESEC's Calendar of Activities (2019)

Extract 1 above shows inconsistency between theory and practice. The calendar of activities for secondary Education shows in section 9 outline 4 found in the image above shows that the principal should assess the coverage rate of practical in laboratories, specialized halls and

workshops in line with annual estimates. However, this is hardly practiced in the field as seen in annual reports.

1.3.0. CONCEPTUAL BACKGROUND

This section briefly defines and examines the following concepts: educational policy, planning, planning norms, planning process, planning context, planning constrains, and Information Communication Technology (ICT) program in the context of this work.

Approaches to educational planning

According to Yawe (2010), there are three rival approaches to educational planning. The three rival approaches are:

1. The manpower requirement approach
2. Rate of Returns Approach (Cost Benefits Analysis approach)
3. Social demand approach
4. The synthetic (eclectic) approach

Manpower requirement approach

The term "man power" denotes the attempt to develop a nations human resource to meet the demands of her economy (Ololube, 2010). The manpower requirement approach is applied purposely to aspects of skilled manpower in the labour force. The man power approach educational planning is based on the view that any nation with plans or aspirations for economic development has to consider the preparation of its human agents of development.

Therefore, human resources could be regarded as the energies, skills and knowledge of the people which when develop can be used for production of goods and services. Hence the human resources or the man power requirement approach to the development of any society is people oriented with emphasis on the developments of thoughts, motives, beliefs, feelings, aspirations and the culture of the people.

Cost Benefits Analysis approach

It is also called the rate of return analysis. It is the systematic comparative of the magnitude of the costs and benefits of some form of investment in order to assess the economic profitability. Resources are very limited; therefore, an analysis of cost and benefit of an investment provide a measure of yield expected of such investment which then serves as a guide to efficient allocation of resources. Kaufman (1968) and Corrigan (1969) have presented

an overall educational management process model that stresses the needs for a revision for a basis of evaluation. Their management process is composed of the following elements;

1. Identify problems (based upon documents needs)
2. Determine solution requirement and solution alternatives
3. Select solutions strategies from amongst alternatives
4. Implement selected strategies
5. Determine performance effectiveness
6. Revise as required at any step in the process

Social demand approach

According to Ololube (2010), this is the method used in predicting social demand for education by parents and children. It is a traditional approach that focuses on consumption of education. In applying this method, planners consider strategies that will enable them make adequate provision for everyone who is qualified and willing to receive education irrespective of the manpower requirement (Adesina, 1990; 2013; Yawe, 2010).

The synthetic (eclectic) approach

This approach is a synthesis of various approaches. It draws on the benefits of the other three approaches. According to Adesina (1999), this approach was developed by Professor Fredrick Harbison. It calls for the integration of the education with the general economic and social development planning. This approach affords educational partners the benefits of each of the approaches earlier mentioned (Ololube, 2013).

1.3.1. Educational Policy

According to Akemche (2014) educational policy refers to educational plan, principles, course of action, guide lines, a statement of ideas or principles, and conduct of education adopted by a given country for the growth and development of the educational sector. This is done through the elaboration of aims, goals, and objectives which guide the functioning of the educational and school systems to be more and more effective and efficient. In the Cameroonian context educational policy refer to laid down principles, government policy making as well as the collection of all the rules and regulations, and laws that govern the educational sector in Cameroon (Akemche, 2014). The main law guiding education of primary and secondary education in Cameroon is Law N^{o} 98 of 4th April 1998 that laid guide lines or orientation for education in Cameroon. It was recommended by the 1995 national forum on

education; deliberated, amended and adopted in parliament and promulgated into law by the head of state in 1998.

Ranjan and Prakash (2012) states that it is important for a society to attained education, because education is a very important element of economic, socio-cultural, and political development of a nation. Therefore, the status of education has to be both quantitative and qualitative. That is why Akemche (2014) states that section 5 of the Law N^{o} 98 of 4th April 1998 stipulate that the aim of education will be to ensure the intellectual, physical, civic and moral development of children as well as to ensure their smooth integration into the society considering the existing economic, socio-cultural, political and moral factor. Integration in this digital age cannot be possible without a basic or sound knowledge on modern technologies especially ICT. That is why in 2002 ICT was introduce into the Cameroonian educational system and made a compulsory subject in 2003.

1.3.2. Planning

UNESCO (2010) consider planning as an intellectual anticipation in the direction of future situations, making a choice of desirable objectives to be attained and determining the relevant actions or activities that would be needed for application in order to attain the chosen objectives at a reasonable cost. On the other hand, Adam (2002) had earlier state that planning is important because major decisions on changes taken by international agencies are on education in general and educational governance in particular. It occurs in varying degrees and at different speed range, from increasing devolution of educational responsibilities to decision authority. These trends therefore require a lot of planning to be successively successful. That is why UNESCO (2010) lays emphasis on planning as the process of thinking about future events and activities and taking measures to control them through the processes of organisation and management of available resources so as attain set objectives.

Furthermore, Aggarwal and Thakur (2003) consider planning as a formal process with the purpose of making decisions on the future of both individuals and organisations. Also, planning has to do with aims, goals and objectives, selecting scientifically correct strategies and activities or programs to attain set aims, goals, and objectives through determining and allocation of available resources as required and above all communicating plans and every activity to all those concerned. That is why Adams (2002) earlier state that the general trends in planning profoundly affects educational actors and decisions. This influence ranges from change strategies, localisation of curricula opportunities, giving concepts such as quality

operational meaning, establishing the relevance and efficiency of education and the nature of educational financing. Aggarwal and Thakur (2003) conclude by stating that plans refer to a statement of activities to be carried out, the sequence to be followed in execution, and the timing or the period and duration required for the activity to be done with the vision of attaining a set objective.

According to Bayo (2013), there are several aspects of school planning, including; administrative planning, academic or curricular planning, co-curricular planning, instructional planning and institutional planning. Planning is regarded as the most basic of all management functions. It involves the selecting from among alternative future course of action for the organization as a whole and every department or section within it (Olusanya, Awotungase, Andohadebere, 2012)

It is important to note that planning involves looking at a number of different procedures (UNDP, 2009)

- Identifying the vision, goals or objectives to be achieved
- Formulating strategies needed to achieve the vision and goals
- Determining allocating resources (financial and other) required to achieve the vision and goals
- Outlining implementation arrangements, which include the arrangements for monitoring and evaluating progress towards achieving the vision and goals.

To achieve the aims and objectives of education, chinapah, and Odero (2016) stipulates that effective planning with organizing, staffing, directing and controlling are required.

According to (Okunade, 2004), there are several types of educational planning viz administrative planning, academic or curricular planning, co-curricular planning, instructional planning, and institutional planning.

Features and characteristics of educational planning

Management gains importance in the light of achieving the objectives of the school and planning for the same (Gasesha, et. al 2012). According to them, a good plan should aim at the improvement of physical facilities, teachers, library services, curricular, co-curricular activities, participation in community programs and the like. A good plan must mention the purpose, goals to be achieved, co-ordination among the stake holders in executing the plan, the

standards to be achieved, flexible to allow for modifications/innovations in the light of experiences. It should also indicate the monitoring mechanism during implementation.

The above author advances for the features of a plan as follows

1. Planning is process rather than behavior at a given point in time. The process determines the future course of the action
2. Planning is primarily concerned with looking into future, which requires forecasting of the future decision
3. Planning involves selection of suitable course of action
4. Planning is undertaking at all levels of management and is concerned with the future course of action
5. Planning is flexible as commitment is based on future conditions which are always dynamic
6. Planning is continuous managerial function involving the process of perception, analysis, conceptual thought, communication, decision and action

As concerns the characteristics of Planning Adesina (1990), explains that planning should be mission-oriented and future oriented, pervasive and should focus on the primary things.

While embarking on a planning process can be daunting, using a clear, specific process can make the process much more effective and efficient (Kang, 2015). To Ololube (2013) planning is the process of determining a scheme for accomplishing a purpose. Such a scheme of arrangement is to be made before hand by preparing a purposeful method of achieving the desired objectives.

The educational planning process by Minzberg, (1991) (p.72) cited in Babey, T. (2018).

- Environmental Analysis: The assessment of needs and establishment of a link between the environment and the goals and objectives
- Resources Analysis: This is an inevitable means of identifying the strength and weaknesses of the nation over its competitors. Take stock of what is needed, what is available
- Determination of the Extent to which Strategy Change is required: This is assessing a top-level management decision on whether to modify the existing strategy or its implementation. What do we need to change or adjust to facilitate achievement?

- Decision making: This bothers on what to do and how it is to be done after taking stock of the real situation and what is needed as well.
- Implementation: This requires the practice of choosing a strategy. It is implemented through a process of allocation of various educational resources including guidelines
- Control: This is to ensure that implementation is being achieved in line with objectives and conformity with the chosen strategy e.g. tools and mechanisms of checking the progress rate i.e. pace of implementation of programs and difficulties.

1.3.2.1. Planning norms

According to Nyansi (2014) planning norms refers to legislative and regulatory rules or texts of conduct according to their judicial importance, legal values and legal standing that determine the functioning of the educational system or a program. In Cameroon planning norms are classified into legislative and regulatory texts. Legislative texts has to do with the constitution, international texts, and laws; while regulatory text has to do with ordinances, decrees, ordinances, orders, decisions, and instructions. Furthermore, Nyansi (2014) states that legal texts are further classified into internal and international instruments. Internal instruments include the constitution and laws with regard to the definition and functioning of the educational system in Cameroon; while international instruments include treaties, conventions, and charters. Therefore, for any subject or program such as ICT to be introduce in the educational system it must have legal and regulatory backing.

Articles 43 and 45, of the revised 1996 constitution of the Republic of Cameroon states very clearly that the constitution is the main law from which legal instruments are made. It is the constitution that gives authority from which international instruments are ratified, planned and applied especially in the Cameroonian educational system (Nyansi, 2014). The main law that guides education at the elementary, secondary and teacher training level in Cameroon is law No 98/004 of 4th April 1998 (Akemche, 2014). This law also known as the law of orientation lays down the general framework of education in Cameroon. In section 5/1 one of the purposes of education in Cameroon is to train the learners to be deeply rooted in their culture but open to the world. In this technological age one cannot be open to the world else the person is technologically literate. That is why ICT became an integral subject in the teacher training colleges in 2007, and educational technology to accompany the students with the didactics of ICT.

1.3.2.2. Planning process

Planning process may differ from organisation to organisation depending on their aims, objectives, activities to be carried out and prevailing contextual situations. Puamau (2006) holds that there is neither a perfect plan nor a right or wrong process of developing a plan. What is most important in educational planning process is contextualising your planning stages, and taking into consideration the educational and societal needs, societal values and culture. Since process has to do with stages, the planning stages should be developed in a strategic manner taking into consideration the unique characteristics and priorities of the beneficiaries and the program or the project in question.

Puamau (2006) further affirm that planning process naturally should start at the level of the aspiration of the people and the ministry of education, at this point these aspirations are developed into visions which is later transformed into missions to be accomplished. Then the articulation of goals, objectives, and outcome; accomplishment strategies are put in place with the selection of achievement and performance indicators; timelines are set as well as human, financial and material resources are allocated to programs and their activities; communication of the plan to varies stake holders is done to create awareness; and the plan is implemented and executed, monitored and reviewed if necessity demands, and evaluated using performance indicators. Therefore, planning process can be summarising as follows: diagnoses, implementation, monitoring and evaluation. It is important to note that research and analysis are done consistently in all the stages. Therefore, in planning for an ICT program it is important to develop contingency plans.

Table 09: Showing regions, number of colleges and teachers

REGIONS 2019/2020					**2020/2021**		
Regions	**Number of GTTC**	**Students**	**Teachers**		**Number of colleges**	**Students**	**Teachers**
Adamawa	6	650	116		6	1047	171
Center	11	1046	646		11	1552	632
East	5	445	147		5	981	143
Far north	7	225	270		7	2785	248
Littoral	5	775	220		5	1086	262
North	6	1203	198		6	1643	175
North west	9	611	292		9	870	347
West	9	1119	277		9	1368	229
South	6	358	148		6	768	148
South west	9	570	371		9	694	340
Total	73	9307	2685			1945	9183

Source: Researcher's Computation (2021)

The table 9 above shows how the number of Teacher Training College found in the following regions are related to the size of the region. Teacher training colleges are only found in divisional headquarters and the larger the larger the region, the higher the number of colleges. The center region has twenty (20) as the highest number of colleges. The number of teachers as against students is encouraging for, South, North West, Littoral, Center, East, the South West and Adamaoua but in the West, Far North and North. For example, 220 teachers can reach out to 775 students in the center regions whereas in the West region 1119 students supersite the strength of 277 teachers. Table 4 also shows that students entering the Teacher Training College have witness an increase from 2019/2020 to 2020/2021 academic year.

1.3.2.3. Planning Context

Educational planning according to Puamau (2006) must take into consideration the local realities of needs, values, and culture. This is because needs, values and cultures differ so also as their philosophy on education. Aggarwal and Thakur (2003) states that diverse philosophers and educationist have examine education from different angles. Therefore the purpose of educational statistics globally according to UNESCO in Aggarwal and Thakur (2003), is to understand its evolution, organise, and put in place a communication design that facilitate learning within a particular geographical and cultural zone or area taking into consideration local realities. More often these local realities are financial issues, socio-political issues, health issues, and available or required resources.

In planning a program, the program planners need to take into consideration the sequence or pattern of aims and objectives with local realities. This activity involves a person to person or agency to person contact on the setting up of the learning environment as well as the organisation and putting in place of the method of instruction of which communication is a key factor (Aggarwal and Thakur, 2003). Communication at the implementation stage need to consider the local realities and the best way of transmitting knowledge and skills so as to bring about the expected changes as stated by the goals and objectives. Aggarwal and Thakur (2003) further states that the means of implementation which result in the learning experience has to contain elements of duration or time and continuity. There exists no fix duration as it differs from program to program, but ICT program is continuing though they vary in degree. The nature of communication is very important in transferring ideas, messages, strategies, knowledge or skills in the form of information. It can be direct, verbal, indirect and more often with ICT other channels and the media is exploited.

1.3.2.4. Planning Constraints

The planning of a program cannot be without obstacles or difficulties. According to UNESCO (1999) in Mekolle (2020) states that educational planning and implementation constrains revolves around infrastructural development, facilities, and human resource planning. Therefore, volatile economic periods demand the constant (annual) re-examination of resources, resulting in an adjustment of policy. Also, Mekolle (2020) reiterate that it is a global phenomenon that educational systems are constrained (obstructed) towards smooth functioning by insufficiency of resources. In developing countries like Cameroon where school age population increasingly constitutes the majority and has resulted in a problematic situation especially in educational financing, and the demand for education is increasing beyond the capacity of the educational system in terms of resources and facilities.

The high increase in demand for education has created a series of gaps especially in planning and implementation. This has resulted in global recommendation requesting the proper planning and efficient exploitation or use of the available resources to compensate for the insufficiency, while examining and exploiting the alternative sources of funding and financing to supplement the insufficient available resources. Cameroon as a developing country focusing towards emergence by 2035 focuses on the planning and actual management of the limited resources available for educational development. Cameroon educational system faces serious problems with regain to persistent wastage which compound the environmental, organisational, strategic, and resources crisis (Mekolle, 2020). This has resulted in difficulties in comfortable attaining set goals and objectives in the educational sector. Therefore, constrains in this work refer to environment (urban and rural), organisational, strategic, and resource obstacles in the planning of ICT program in teacher training colleges in Cameroon.

Figure 01: Abandoned Computer Laboratory GTTC Fundong (2019)

Source: Fieldwork 2019

1.3.3. Information Communication Technology program

Information and communication technologies (ICTs) such as radio and television, computers and the internet have been touted as potentially powerful enabling tools for educational change and reform. (Tinio, 2003). That is why many governments, international and national organizations emphasize reforms that will promote effective integration of ICTs in education. The United Nations and the World Bank both advocate the use of ICT to support the development of the world's poorest countries. The African Heads of State (African Union, 2004) concur citing the potential for ICT to promote trade, improve health care, enhance good governance, and make education more available. In this regard, the World Bank report notes that ICT can increase access to education through distance learning, enable a knowledge network for students, train teachers, and broaden the availability of quality education materials.

At the World Summit on the Information Society, the United Nations (2005) notes the potential of ICT to expand access to quality education, to boost literacy, and to provide universal primary education in developing countries. Much has been promised by multinational organizations for ICT to address the world's economic and social needs, especially in the area of education. But it is left to individual nations to deliver on these promises. National policies and programs can be an important tool for the realization of ICT's promise in education. In the same light, WBI (2007:125) reports that many developing countries, however, continue to

struggle with difficulties stemming from unresolved problems such as expanding education coverage in a sustainable way, inequalities of access and outcomes, educational quality and relevance, and inflexible governance structures and management practices (Kibinkiri, 2014).

1.3.4. The concept of Competence development in different views

Competence development is a concept that accompany teacher training especially in this technological age. Professional development has its goals as per the specialty, for this reason Desimone et al. (2002) and Borko (2004) in Bautista and Ortega- Ruíz (2015) consider teacher professional development to be a key mechanism which enhances teacher trainee's knowledge and instructional / teaching practices. On the other hand, Darling-Hammond et al. (2017) define professional development from the perspective of effective professional development which refers to the professional structuring of learning which results is visible in the changes that come in teacher's knowledge and practices, and improving students learning outcomes. It is therefore seen as product of job embedded learning activities that result in increasing teachers' knowledge and facilitate teachers in the process of changing the instructional/teaching practices in ways that support student learning. Therefore, professional development in relation to Information and Communication Technology (ICT) has to do with a range of technological experiences that stimulate professional learning.

Also, Gusky (2002) in Bautista and Ortega- Ruíz (2015) holds that professional development is about changes that occur in a teacher's attitudes and belief. While Opfer and Peder (2011) in Bautista and Ortega- Ruíz (2015) emphasize the increasing need for complex understandings because professional development has the potential of impacting a series of aspects in a teacher's professional life such as knowledge, skills, academic performance, competences, and above all values. Also, Darling-Hammond et al. (2017) consider that the new paradigm of professional development as result of research distinguishes the traditional and technological opportunities of teacher learning. Therefore, there is a development of consensus with regard to key principles in the designing of learning activities or experiences that strongly impacts teachers' knowledge, skills, academic performance, and competences (practices).

1.4.0. THEORETICAL BACKGROUND

This section briefly present and examine the theories of Rationality Planning Theory, Increment planning Theory, Consensus planning Theory, Technological Pedagogical and Content Knowledge (TPACK) and Social Learning Theory are closely examined in relationship to the work.

1.4.1. Rationality planning theory

Akintson (2011) focuses the discussion of rationality planning on comprehensive rationality of which the 'centre' is so influential to cause a policy change through decision making of and individual, a core-executive, or a governing organisation. ICT program introducation in Cameroonian schools was the sole decision of the head of state. Therefore, Akintson (2011) ask if there is an ability for an individual actor at the 'top' to carryout research and inreturn articulate a number of consistent policy aims and supervise their execution; or an organisation acting in the same manner or direction as a rational decision maker.

With respect this Mukhopadhly (2015) holds that rationality in the planning process consider that planners first develop alternatives before taking intelligent rational actions based on evaluation. A rational decision making process is considered to aprocess of empowering planners to evaluate policy alternatives scientifically when making decisions. In this process, there is public input motivated by contextual factors just like the putting in place of ICT as a subject in school in the technological age, the experts exploit modern economic and statisticalanalysis tools to reach at a decision.

Furthermore, John (1998) in Akintson (2011) holds that comprehensive rationality recommend that policymakers who are elected should work to translate their values into policy, and they should be aided or assisted by organisations operating in a more logical, reasoned as well as neutral manner. Akintson (2011) states that the comprehensive rationality model is constructed base on the followin assumptions: saparation of values from facts when research in policy by policymakers identifying their aims or goals and organisation assessing the best means to attain these aims or goals; there should be consistancy in policy preferences ranking them to facilitate maximising social or educational gain; the linear nature of policy making should be respected by identifying policy aims fromvalue perspective (identification), means of achieving them (making decision), and selected the best means in achieving them(implementation); Mukhopadhly (2015); and anaysis of decision making context should be done taking into consideration all relevant factors.

1.4.2. Increament theory of planning

Incrementalism is often refered to from three mainperspectives (Akintson, 2011). Increment according to Akintson (2011) is often refered to gradual change through a step by step process which can esily establish the crucial distinction between radical and non-radical change. Incremenalism is also refered to as a description of the manner in which policy is

arrived at or the discussions on the most useful strategies to emback on. On the other hand incrementalism is is refered to the analytical strategies used to decide how problems will be resolved and is closely related to comprehensive rationality. Akintson (2011) examine incrementalism from the perspectives of simple incremental analysis and disjointed incrementalism. Incremental analysis has as limitation a little number of policy options which are diverge incrementally from the basic status quo. It assumes that it is more advantageous to analyse a limited number of issues comprehesively. Also, disjointed incrementalism has to do with simplfying the various srategies used in organisations.

Furthermore, Lindblom (1959) in Akintson (2011) emphasize strategic analysis in incrementalism that has to do with realistic policymaking strategies which are more often exploited as an alternatives.it also relate to a number of political as well as educational strategies and the intricases of producing policy agreement such as the implemntation of ICT as a subject in Cameroonian teacher training colleges. In incrementalism goals and policies have to selected simultaneously, the alternatives need to be considered marginally different fromstatusquo, alternatives have to be compared and simplified, trust should be focused on social experiment results than theory, repeatedly address the problem to be resolved, planners are required to restrict their attention to a number of relatively few values as well as polices, and planning behaviour should be theorized. The ICT program planning consider and exploit the princples of incrementalism.

1.4.3. Consensus theory (Communication)

Hudry and Monjardet (2010) states that generally consensus theory represents any phenomenon where several ‘objects’ are merged into one. These ‘objects’ should be of similar or the same nature and the best representative object. In multiple criteria decision aid and social choice theory objects preferences are expressed through a set up criteria or through voting. These preferences are more often modelled through a fuzzy-binary or by-crisp relations of various kinds, which has a possibility of being represented by utility functions.

In a situation where preferences are expressed through choice functions, cluster analysis is used to ensure that the objects under aggregation are classified, partition in terms of equivalence relations or hierarchies. Hudry and Monjardet (2010) further take the example of computer science where ranking can be done through web search engines; and merging objects that are symbolic is considered as an artificial intelligence topic.

In the Cameroonian teacher training colleges' program technology comprise of two subjects; information and communication technology (ICT) and educational technology. The content of the two effective suit the consensus theory because each is representative of the other but a different focus. Furthermore, Horton (1966) in Hudry and Monjardet (2010) consider the consensus theory as a conceptualized scientific function which unify through shared culture, agreement on values or modes of communication, as well as political organization.

This consensus model or theory focuses towards social institution maintenance based on conceptualization of the society striking a balance, structured authority, stability, order, and a moving equilibrium as well as quantitative growth. And in this digital age the ICT program plays the role of maintaining social institution through its knowledge, skills, and competences that are exploited in schools and in the society at daily bases. Hudry and Monjardet (2010) conclude on consensus theory that it can be referred as being synonymous or in the class of structural-functionalism.

1.4.4. TPACK (Technological Pedagogic Content Knowledge) model

Koehler and Mishra (2005) in Voogt et al. (2016) introduces the term TPACK as meaning Technological Pedagogic Content Knowledge abbrevated TPCK today refered to as TPACK and a conceptual framework thatdetails the required knowledge base teachers need to acquire to be able to use technology in the teaching and the learning processes. According to Voogt et al. (2016) TPACK is considered by most scholars as a complex concept,however it resonates with practitioners in the field of educational technology of which Information and Communication Technology(ICT) program is a key component. The model has to do with the way technology is understood and teacher/knowledge interaction. Harris and Hofer (2011) attest that TPACK has to do with a highly applied specialised type of knowledge that supports technology that is content based and faciliate integration.

Koehler and Mishra (2008) in Harris and Hofer (2011) consider TPACK to be characterised by teachers' knowledge of the content in the curriculum, general pedagogies, tecnnologies, as well as contextual infuences on the learning process, making TPACK multi-intersectional. Voogt et al. (2016) states that the manner in which technology is understood determine the measuring approach to be undertaken to verify a teacher's technology pedagogic content knowledege.

The relationship of TPACK to contemporary comprehension of teacher knowledge by questioning the interaction betwen a teacher's beliefs and TPACK as a type of teacher

knwledge. According to Harris and Hofer (2011) TPACK is an development strategy that is exploited in professional development by providing trainees with taxonomy of learning activities in specific specialised fileds of study through a nunmber of digital and non-digital educational technologies.

1.4.5. Social learning Theory and Competence development in educational context

Competence development in educational context comes from the interaction between teachers and students. In the teacher training college, this interaction is designed with specificities to enhance the construction of knowledge, development of learning behaviour and skills, the reinforcement of attitudes and competences (MINESEC, 2013). The objective behind this is to facilitate changes in classroom attitudes, beliefs, practices, and learning outcome of students.

According to Guskey (2000; 2002) in Heijne-Penning et al. (2018) the motivating factor that stimulate teacher's involvement in professional development and pedagogic processes that result in effective change in a teacher, are the main factors that determine practices that influence professional development. Therefore, in planning ICT program for teacher professional development, these two factors have to be greatly considered and put in place. That is why the 2013 ICT program for TTCs was based on the Competency based approach.

1.5.0. FORMULATION OF PROBLEM STATEMENT

It is important in the 21st century for teacher training to include sophisticated teaching types that will help the future teachers in developing learners' competences and deep mastery through challenging content, enhancing critical thinking, solving complex problem situations, reinforcing effective communication and skills, and above all create a sense of self-direction (Darling-Hammond, Hyler, and Gardner, 2017). In the same light, Karolčík et al(2016) emphasize that student teachers should be able to prepare their students for life, they must know and respond to new needs and expectations of the society and purposefully develop competences of students in areas which appear to be extraordinarily useful and important for them to assert themselves in their lives

However, after graduating from Teacher Training colleges in Cameroon, student teachers find it difficult to easily acquire, maintain and create job opportunities for themselves. Some lose their jobs immediately after they are recruited while others are retrained for a long period of time before actual recruitment especially in private institutions. Even when they succeed to get teaching jobs, many of their pupils do not perform very well academically.

The researcher began wondering why the 2013 ICT based Syllabus in from Teacher Training colleges which was aimed at equipping student teachers with adequate skills and knowledge was not achieving it desired goals, The skills insisted in this program were that there were to have general knowledge of various ICTs, have mastery of the functioning of the operating system, have knowledge about the digital environment , produce digital documents, understand internet technology and network etiquette and pedagogically integrate ICTs in class practices and evaluation. These skills are only found in about 5% of the student teachers. While Haji (2017) states that "the teachers' use of ICTs in Cameroon has been less than optimal", Tchombe (2006) on her part established that only 10% of teachers have access to training. She then set forth to find out whether the essentials were considered or put in place during the planning of the ICT program.

1.6.0. OBJECTIVES OF THE STUDY

1.6.1. General objective

The main objective of this study is to investigate the educational policy planning of ICT program and its relationship with students' Competence development.

1.6.2. Specific objectives

1. Establish the extent to which ICT program norms affect students' Competence development in teacher training colleges.
2. Investigate how ICT program planning process affects students' Competence development in teacher training colleges.
3. Establish the extent to which ICT program planning context affects students' Competence development in teacher training colleges?
4. Investigate how ICT program planning constraints affects students' Competence development in teacher training colleges?

1.7.0. RESEARCH QUESTIONS

1.7.1. General Research Question

To what extent does educational policy planning of ICT program affect students' Competence development?

1.7.2. Specific Research questions

1. To what extent does ICT program planning norms affect students' Competence development in teacher training colleges?

2. Does ICT program planning process affect students' Competence development in teacher training colleges?
3. To what extent does ICT program planning context affect students' Competence development in teacher training colleges?
4. Does ICT program planning constraints affect students in Competence development teacher training colleges?

1.8.0. RESEARCH HYPOTHESES

1.8.1. General Hypothesis

Educational policy planning of ICT program significantly influences students' Competence development.

1.8.2. Research Hypotheses

Ha1. ICT program planning norms significantly affects students' Competence l development in TTCs.

Ha2. ICT program planning process significantly influence students' Competence development in TTCs

Ha3. ICT program planning context significantly affects students' Competence development in TTCs

Ha4. ICT program planning constraints significantly influence students' Competence development in TTCs

1.9.0. SIGNIFICANCE OF THE STUDY

This study aims at making an extensive and innovative contribution to knowledge on the effectiveness of planning ICT program aimed at promoting the knowledge and skills of student teachers for integrating ICT in pedagogy in the primary schools. It is very timely in this era of globalization with rapid advancement and influence of information and communication technologies. This research work will help us blend education theories, models, teaching strategies and methods to come out with a credible and acceptable model for implementing ICT program in primary teacher training colleges. This study would be of profound significance to the researcher, teachers, administrators and managers, policy makers and students.

1.9.1. To students/ student teachers

This study is focus on bringing consciousness and awareness in student's minds on the importance of ICTs and the role they play in improving professional development of students. This in return will enable students to be more competitive and efficient in the job market. Societal demands for children get more complex day after day and so they are need for students teachers to be empowered with skills, competences, knowledge, so as to make tremendous changes in the minds of young learners that they are going to teach.

1.9.2. Teachers / lecturers or tutors

In today's educational system there is much focus and talk on the use of technology in pedagogy and one of the key components being emphasised is skills development through the use of ICTs. In ICT in education programs, teachers are 'the key to whether technology is used appropriately and effectively '(Carson and Gadio 2002, p119). The study will enlighten teachers, lecturers or tutors not only to effectively plan and use Information and Communication Technologies in teaching and learning but will be able to understand basic factors involved in planning ICTs such as planning norms, context, process and constraint. This work will also help teachers understand the various exigencies involved in planning educational programs and its effect on professional development of students.

1.9.3. School administrators

At the Government and managerial level, it will help government in educational planning and budgetary allocation that will handle the provision and effective use of ICTs in schools. It will provide empirical evidence to curriculum policy makers on the role and effectiveness of ICT programs in professional development of teachers and stimulate them with recommendations to push for better reforms on the provision and integration of ICTs in teaching. Policy makers will be able to identify gaps that exist between policy and practice and get recommendations to bridge them. The study will encourage teacher training college administrators to effectively plan and implement any existing ICT reforms for effective professional development of student teachers.

1.9.4. To the parents/ community

This study will help parents to comprehend how the ICT programs are planned in a way to influence the professional development of students, and the contributions they can make to make ICT programs to be well planned so as to foster professional development in terms of knowledge, skills and competence of student teachers.

Parents and local communities need to partner with higher institutions to make education productive by financing program, use of ICT tools teaching and learning, and professional development that meet international standards and norms. This will help the community in particular and the nation at large in attaining the sustainable development goal of quality education by 2030.

1.9.5. Educational community

This work will be a guide to educational partners especially local associations such as the Parents Teachers Association, national and international Non-governmental organisations and governmental organisations such as United Nations Educational Scientific and Cultural organisation (UNESCO), respectively to understand the financial, material and technical help they could offer to encourage ICT program planning and implementation in the Cameroon Education system and the Teacher Training System in particular, and reinforce Information and Communication Technology in the teaching and learning process so as to make the Cameroonian educational system in general more professionally productive and why not efficient.

1.9.6. Policy makers, educational planners and the state

This study will enable the government to comprehend the importance of developing and planning ICT programs in Teacher training colleges and the role ICT plays in professional development, thereby impacting education quality. This will motivate the government to encouraged, organise or program ICT programs in universities, educate lecturers and teachers on the need of planning programs in classrooms. This cannot be realised in this age of multimedia (technology) if classroom and lecture halls instruction technologies (ICT) are not planned in relation to their impact on professional development, and reforms done to improve on planning ICT programs. Therefore, government and all its stake holders concerned with education through the various ministries of education has to ensure the effective and efficient ICT program planning and so improve students' professional development to enable high quality standards for our educational system.

1.10.0. SCOPE OF THE STUDY

The scope is examined from the perspective of thematic delimitations, geographical delimitation, temporal delimitation and spatial delimitation.

1.10.1. Thematic delimitations

The delimitation of this study involves exploiting the role of educational planning of ICT Program in the perspective of planning norms, context, process and constraint and its impact on students' professional development in teacher training colleges, in terms of addressing students' knowledge, skills, academic performance and competence.

1.10.2. Geographical delimitations

This research is carried out in five regions of the Republic of Cameroon, three divisional headquarters cities of the five regions in Cameroon were considered. In North West Region, the Government Bilingual Teacher Training College (GBTTC) in Bamenda, GTTC Ndop, and GTTC Fundong were considered. In West Region, ENIEG Bilingue de Bafoussam, ENIEG de Mbouda, and ENIEG de Dschang was chosen while in South West Region, the Government Bilingual Teacher Training College (GBTTC) Kumba, GTTC Buea, and GTTC Bangem were involved and in the Far North Region, we used ENIEG Bilingue de Maroua, ENIEG de kousseri, and ENIEG de Mokolo/Mora. Lastly, we had Centre Region- ENIEG Bilingue de Yaounde, ENIEG de Ngomou and ENIEG de Mbamayo.

1.10.3. Temporal delimitation

The study was carried out during the 2019/2020 and late 2020/2021 academic year.

1.10.4. Spatial delimitation

The focus of this study is on the teacher trainers of Government Teacher Training Colleges in Bamenda, Ndop, Fundong, Bafoussam, Mbouda, Dschang , Kumba, Buea, Bangem kousseri, Mokolo Yaounde, Ngomou and Mbamayo and Regional Inspectors in charge of Information and Communication Technologies and Regional Inspectors in charge of Didactics of Science and Educational Technologies.

The category of teachers in the study were 452 from the five regions and were distributed as follows- in the North West Region, we used 48 teachers in Government Bilingual Teacher Training College (GBTTC) Bamenda, 25 teachers each in Government Teacher Training College (GTTC) in Ndop and Fundong. In the centre region we used 51 teachers in Government Bilingual Teacher Training College (GBTTC) Yaounde, 25 teachers each in Government Teacher Training College (GTTC) Ngomou and Mbamayo meanwhile in West Region we had 32 teachers in Government Bilingual Teacher Training College(GBTTC) Bafoussam, 25 teachers each in Government Teacher Training College(GTTC) in Mbouda and

Dschang. The South West Region also made use of 41 teachers in the Government Bilingual Teacher Training College (GBTTC) Kumba, and 25 teachers each in Government Teacher Training College (GTTC) Buea, and Bangem. Lastly 39 teachers were used in the Far North Region Precisely Government Bilingual Teacher Training College (GBTTC) Maroua, and 25 teachers each in Government Teacher Training College (GTTC) kousseri, and Mokolo/Mora. The total number of teachers was 452 and 10 Regional Inspectors representing 2 a region was used as sample for this study.

1.11.0 JUSTIFICATION OF THE STUDY

Today, most countries and educational institutions are looking for an optimum distribution of resources and services to yield maximum benefits to students, teachers and the management alike. For these reasons from the past, the training of teachers has been a concern to researchers and all stake holders in the society. Education is one of the fastest growing industries in the world, greatly affected by political, social and technological factors. Primary education is the bedrock of any successful educational system. By the 1970s, many countries were experiencing shortcomings in their educational system as a result of an educational planning that was too fragmented and non-integrated to the other sectors of the economy. Poor planning and inadequate administrative practices will inevitably result in poor delivery of educational services. Planning is the identification of purposes and objectives and setting forth of the means of attaining them.

Some of the critical issues that plague Cameroon educational system are, unemployment of graduates more demand for schooling and, supply, financial-bottlenecks, wasteful imbalances within the educational system, the wrong kind of education etc. To solve these numerous problems, several countries have started making use of the effective reality of Educational management. Educational management is concerned with the planning and formulation of educational policies and programs with a view to achieving educational goals. In addition, the curriculum has been criticized on the grounds of its quality and quantity and that it does not match with the ever-changing scientific development. Also, the economic situation of Cameroon has made the young to consider teaching as a less desired profession.

The Cameroon system of education is currently in a face of profound reforms at the level of primary and secondary education including the implementation of ICTs. Among the reform objective is the desire to ameliorate the efficiency of the system through an improvement of the internal output; that is increasing the rate of promotion to superior classes,

reduction of repetition rate and finally reduction in the gap that exist between urban and rural schools in terms of performance (Fonkeng, 2009). There was therefore a need to carry out a study which seeks to ensure skills and competence are developed first to the primary school teachers and then to their pupils and kids. Change is an essential function of the managerial role (Fonkeng, 2009) which may be initiated from within the school or impose from outside. It may take the form of making improvements in the way in which we archive on-going goals, or we may have to cope with new goals and challenges (Everared, Morris and Wilson, 2004).

Furthermore, the researcher was encouraged in this study because, the route for putting in place and implementing a concise ICT policy in Cameroon has been a daunting task. Mbangwana (2008) contends that empirical evidence from eight schools in Cameroon, reveal that the integration of ICT in Africa remains sporadic and without clear direction. As concerns the role of public governance authorities and other stakeholders in the promotion of ICTs for development, Tamukong (2007) doing a comparative analysis of ICT policies and drafts in some African countries postulates that Cameroon used a non-participatory (Top-down) approach for ICT policy formulation as the government formed a National Committee of Experts who came out with its policy based on a comparative study approach complemented by a local case study.

The process of change demands that managers focus a great on developing resources to meet new challenges and needs. If the educational system is to progress and be relevant to the society, it must be 'need driven' and not resource driven' that is to say resources must be adapted to meet needs and no vice-versa (Everared, Morris and Wilson, 2004). The school manager at all levels of learning in Cameroon is constantly pre-occupied with the job of adequately utilizing available human, material and financial resources to obtain maximum level of teaching-learning activities in the institution (Fonkeng, 2009).

Furthermore, empirical research on the policy planning of ICT programs is largely lacking especially in the primary teacher training college. A lot of literature exists concerning the integration, usability and nature of ICTs use in Education. This work goes further to find out ICT programs should be designed/planned to foster professional development, proposed a model that can be used to ameliorate skills, competence and knowledge in student teachers and consequently learners. Cementing the concepts of lifelong education.

In similar perspective, the researcher haven successfully defended her first degree and masters in topics related to ICT, thought it worthy to continue in an ICT related theme. The

continuation will help her exploit deeply the use of ICTs. The researcher has gradually moved from the effects of ICTs on academic performance to the effect of computer assisted instructions on interest/retention/academic performance and finally to a specific effect of ICT policy link to ICT program on professional development.

1.12. DEFINITION OF KEY CONCEPTS

Educational policy: According to Akemche (2014) educational policy refers to educational plan, principles, course of action, guide lines, a statement of ideas or principles, and conduct of education adopted by a given country for the growth and development of the educational sector. In this study, the researcher considered some external and internal policies that shape education as a whole but specifically the ones that are linked to teaching and learning of ICTs in the teacher training colleges.

Planning: UNESCO (2010) consider planning as an intellectual anticipation in the direction of future situations, making a choice of desirable objectives to be attained and determining the relevant actions or activities that would be needed for application in order to attain the chosen objectives at a reasonable cost. In our context, Planning involves dealing with aims and objectives, selecting correct strategies and program to achieve the aims, determining and allocating the resources required and ensuring that plans are communicated to all concerned.

Educational policy planning: Akemche (2014) holds that educational policy planning can be referred to as the process of elaborating a plan of action statement of ideas, guidelines, principles or code of conduct put in place by the government for the education of the country.

ICT: It refers to ICTs such as computers, radio, television that is, all the equipments both hardware and software used in processing Information and in Communication Technology.

ICT program: ICT program here refers to the 2013 syllabus currently being used in primary teacher training colleges. This program saw the inclusion of ICTs and Didactics of Educational Technologies as new subjects.

Planning norms: Planning norms implies all the legislative and regulatory rules or texts of conduct, legal values and legal standing that determine the functioning of the educational system or a program.

Planning process: Puamau (2006) considers planning process as natural stages that start at the level of the aspiration of the people which are developed into visions which is later transformed

into missions to be accomplished through diagnosis, implementation, monitoring and evaluation.

Planning context: Aggarwal and Thakur (2003) states that planning context refer to the means of implementation which result in learning experiences. It includes elements of duration or time and continuity, taking into consideration local realities such as financial issues, socio-political issues, health issues, and available resources.

Planning constraints: According Mekolle (2020) planning constraints refer to a global phenomenon of obstacles faced by the educational systems are constrained (obstructed) towards smooth functioning by insufficiency of resources

Professional developmemt: Kibinkiri (2014) defines professional development as investments or improvements in human capital (acquisition of knowledge, skills, and competences needed for work and life. It refers to all the skills, knowledge and behavior change that come as a result of the teaching and learning of ICTs. In the context of this study professional development is giving students giants opportunities to gain skills, attitudes and knowledge through the use of a well-prepared planning of ICTs in the Teacher Training Colleges.

Skill: Skill is the ability to do a task correctly. It is a specific learned ability that qualifies individuals to perform task successfully. Skills can be transferable.

Knowledge: Facts, information and skills acquired through experience. It can be understanding of facts, principles, theories and procedures

Competences: It is the Possession of knowledge, skills and attitude required to perform tasks correctly. To be considered competent, the knowledge, skill (ability) and attitude must be required and exhibited. The possession of these skills and actually using them to solve practical problems in the domain. Competencies are group of skills, behaviors, abilities, knowledge etc which enable an individual to perform task. Competency is not transferable.

1.13. CONCLUSION

This chapter has presented the background trends of the problem under study from the perspectives of historical, contextual, conceptual, and theoretical backgrounds to the problem under investigation. Further, the historical background section presents the historical evolution of educational program planning, educational policy planning, history of educational policy planning in Cameroon, education policy planning for TTCs in Cameroon, trends of ICT in

education, ICT policy planning in Cameroon, evolution of students' professional development. Secondly, the contextual background section presents the Cameroon , history of the evolution of TTCs in Cameroon, and Information and Communication Technologies (ICTs) in Cameroon's TTCs.

Also, conceptual background section provided a brief definition and insights to the concepts educational policy, planning, planning norms, planning process , planning context, planning constraints, ICT program, professional development. And the theoritical background background section presented briefly on theories used in the work. furhermore, there has been the presentation of the statement of problem to the study, objectives, research questions, research hypotheses, scope of the study, and definition of key concepts of the study.

CHAPTER TWO
LITERATURE REVIEW

2.0.INTRODUCTION

This chapter presents the writings, views and publications of diverse authors with respect to ICT program planning from the perspective of planning norms, planning process, planning, context, and planning constraints. It covers the conceptual framework, empirical framework and theoretical framework.

CONCEPTUAL FRAME WORK

2.1.0. Educational policy planning

Akemche (2014) holds that educational policy planning can be referred to as the process of elaborating a plan of action statement of ideas, guidelines, principles or code of conduct put in place by the government for the education of the country. Also, it has to do with the process elaborating principles and government policy-making in educational sphere, as well as the collection of laws and rules that govern the operation of educational systems. For example, the law that guides education in Cameroon is law N°98 of 4th 1998 on guidelines of education in Cameroon and also, educational policies of African French Speaking Countries lay down by CONFEMEN. Educational policy planning can also be said to be the process of setting goals and objectives with the view of making an educational system function effectively and efficiently. Externally, policies and other directives emanate from the presidency, National Assembly, and the ministry of National Education in the form of Decrees, Orders or texts, for the smooth functioning of the schools. Internally, that's within schools, policies and directives regarding the internal functioning of the school are initiated by school principals and their collaborators. In practice, order, authority and more precisely, leadership are not ultimately achieved in school organizations through decrees, orders or ministerial texts (Epah and Elisabeth,2009)

2.1.1. Educational policy planning of ICT Policy from an International perspective.

Alinaghian, Rahman and Ibrahim (2011) see ICT policy is an ICT infrastructure that supports other ICT infrastructure components. It has multiple goals such as improving ICT quality, efficiency, security, legality and ethics. To better identify the gaps in the putting in place and implementation of ICT policies or reforms in Cameroon, it is worthwhile examining what prevails in some other countries. For simplicity, it is important to discuss this based on

the vision for ICT in relation to national development and in education, the role of public governance authorities and other stakeholders in the promotion of ICTs for development, Information and communication infrastructure and curriculum development that influence the integration of ICT in teacher education. These countries, however, based on strategic issues such as finance, educational policy and others differ in their mode of integration.

With respect to the vision of the Italian policy on ICT integration, Bottino (2003) holds that the Italian Ministry of Education in 1997 launched a Program for the Development of Educational Technologies (PSTD) with its main goals being: the provision of infrastructures to schools (PCs, internet connections, and accessories); the improvement of teachers' professional skills in using ICT; the improvement of effectiveness of learning, teaching methods and content; and the promotion of the use of ICT and multimedia tools among students. The Italian government through the Ministry of Education took the lead, working with other partner organizations. The Italian government, in line with the e-Europe Plan, adopted an Action Plan for the Information Technology Society in June 2000 with the aim to further complete and strengthen the educational technologies development program (Bottino, 2003).

Concerning the provision of Information and Communication infrastructure, Bottino (2003) writing on *Italian Policy for Technology Enhanced Learning* contend that the Italian Government put in place programs for equipping educational institutions with the necessary ICT infrastructure and train teachers. The action plan between the Italian governments in line with the Europe Plan, offered funding to individual schools for the creation of equipped laboratories and for organizing autonomous basic ICT courses for teachers. A total of 13,300 Italian schools were involved between 1997 and 2001 even though the situation is quite different from school to school with regard, for example, to school level, school typology, and school geographical location (Bottino, 2003).

According to Fierli (2002), the average current situation regarding technology infrastructure in Italian schools is as follows: Primary school (age 6–11) had 1 Personal Computer (PC) for every 50 learners, with 80% of primary schools having internet connection. For Lower secondary, (age 11–14) they had 1PC for every 25 students and 80% of schools having internet connection. The Upper secondary (age 14–19) had 1PC per 10 students, with 100% of technical schools and 80% of Lycie having internet connection. Technological equipment here however is mainly located in laboratories and access is seldom available from classrooms.

As far as curriculum development and teacher training on ICTs is concerned, the Italian Government made some strides with the first widespread initiative of the Government being the National Plan for Informatics, launched in 1985 (Bottino and Furinghetti, 1999). This was a centralized plan for in-service mathematics teacher training whose aim was to provide basic computer science literacy. This training plan was enacted through courses for teachers in which traditional lessons alternated with computer practice. The method used was a "pull-down" one, where the training program is operated through trainers who are in-service teachers specifically trained for this purpose. These training initiatives had been funded by the Ministry but their organization and content had been left to schools. Between 1997 and 2001, 43,300 refresher courses for teachers were consequently organized.

Furthermore, Bottino (2003) holds that it can be said that approximately half of the Italian primary and secondary school teachers have been involved in training initiatives related to the use of information and multimedia technologies. Quality and depth of training have been very variable. The Ministry of Education in Italy also launched and financed the development of on-line services for training support. Online training at present is involving approximately 60,000 teachers (Bottino, 2003). A new initiative was further planned to involve 180,000 teachers. This initiative foresaw 12 hours of training for each teacher. That is, six hours face to face and six hours on-line. Still in the domain of curriculum development and implementation, the Italian Government has a challenge in enabling teachers' reform teaching methods and a change in approaching discipline subjects to go effectively with ICTs.

According to Bottino (2003), even though the government program for the development of educational technologies has achieved significant results in providing schools with technology infrastructure and a considerable number of teachers with ICT basic skills, it has nevertheless not led to an improvement of teaching and learning methods and to a change in approaching discipline subjects. To him, a direct relationship cannot be established between provision of infrastructure and ICT training, and the effective pedagogical use of technology in schools. This last goal is less clearly supported by governmental policies and needs a careful consideration of related difficulties and possible interventions.

Different challenges have promoted this limitation such as the resistance on the part of many teachers to use ICT in class, the lack of technical personnel to help manage laboratories, the fact that the substantial time dedicated to preparation of materials and lessons which integrate technology use is not acknowledged in teachers' current work time, and the limits imposed by the overall scholastic system, that is the ever bigger number of subjects and topics

present in syllabuses, the limited time available, the question of individual assessment of students, the often poor quality of educational software available, with a predominance on the market. Moreover, ICT training often has been confined to the development of product-related skills rather than the promotion of more general and critical skills such as, how to choose among different products, how to develop capacities of finding proper and meaningful information on the web, how to use available products in discipline teaching (Bottino, 2003).

In addition to the great effort of the Government in providing schools with ICT infrastructure and teachers with a basic knowledge in ICT, Bottino (2003) holds that the Ministry has recently promoted initiatives to support the use of ICT in classroom practice. Some projects have been launched to provide teachers with examples of practice in which technology has been used to support the teaching of discipline topics. Such projects are aimed at publishing on the Internet didactical itineraries, both at primary and secondary school level on curricular topics integrating ICT. These projects have had positive aspects such as the involvement of both teachers and educational researchers in the implementation of the educational itineraries and have represented interesting experiences for the teachers directly involved in the work, but still they have not had a significant impact on a wider basis. Technology however can influence learning by fundamentally changing both the content of a subject and the way in which that content can be taught and learnt. If the teaching methods remain largely unchanged, then the integration of ICTs in pedagogy is largely not effective.

The adoption of ICT policies in some countries of the Asian continent also present some important lessons and challenges from which other countries can benefit. Looking at the situation in the Asia Pacific Region (Malaysia and Thailand), Downes, Khun, Scott, Leonard & Warhurst (2003) contend that countries in the region are at different stages in adopting national policies relating to ICT in education and also have different levels of resources devoted to such policies. Concerning the vision of the ICT policy in Malaysia, the country report for Malaysia notes that the Prime Minister announced his Vision 2020 for Malaysia in 1992 and in 1994 unveiled a plan for a multimedia Super Corridor, which involved the development of Smart Schools with the aim that by 2010 all schools in Malaysia will be Smart Schools.

An Outline Perspective Plan for 2001-2010 aimed to: Develop a quality workforce that is knowledgeable with highly tuned thinking skills, is able to use technology and new resources optimally to combine creativity and innovation effectively and has a diversity of skills and knowledge in the use of ICT, educate students so they are knowledgeable and ICT literate and able to use technology for the betterment of themselves, their communities and their nation

(Downes et al. 2003). Frost & Sullivan (2010) define the Smart School as a learning institution that has been reinvented in terms of teaching and learning methods and school administration system in order to prepare the students for the Information-Based Society. Creativity and better management of information is facilitated through the use of technology where students, teachers, administrators and parents are better prepared for the challenges of the information Age.

Since the Smart School initiative was launched in July 1997 as one of the seven flagships of Malaysia, there has been much accomplishment in integrating ICT in education, and this began with piloting the 88 Smart Schools which were given the 'role' to act as the nucleus for the reference of Smart School concepts, materials, skills and technologies developed by the Malaysian Ministry of Education (Frost & Sullivan, 2010). In order to encourage active interest and participating of schools, a measured and graded benchmark of ICT utilization of the Smart Schools was created known as the Smart School Qualification Standards, with a 'Star Ranking' system was used to appraise each school in terms of Utilisation, Human Capital, Applications and Technology Infrastructure. To qualify as a Smart School, the 10,000 schools must achieve the minimum conditions of 3-star specified for each Key Performance Indicator within the four areas specified (Frost & Sullivan, 2010).

On the role of public governance authorities and the role of other stakeholders in the promotion of ICTs for development, the Malaysian Policy on ICT in Education was built on the back of consultative approach with all relevant stakeholders through many rounds of brainstorming and focus-group discussion. This therefore means it was not a top-down approach where the Ministry of Education will ram the ideas down the throats of the implementers (Frost & Sullivan, 2010). The government and its partners are also instrumental in the provision of ICT infrastructure to ensure the accomplishment of their vision.

Under Curriculum development, the country report for Malaysia holds that its documents explicitly require the use of ICT (Downes et al. 2003). In this perspective, Frost and Sullivan (2010) made a distinction between the different types of policies that involve the domain of ICT in education. *ICT Policy for Education* will be too narrowly-focused on enforcing certain regulation, rules, operating procedures on the use of ICT hardware and software applications in the classrooms or computer lab typically because ICT under this type is considered a separate department from education, mainly functioning as an ad-hoc educational tool and not the all-encompassing role of an enabler to improve education.

Education Policy for ICT is also a narrow scope of focus, only defining the education syllabus or curriculum that should be covered under a computer course.

This may prove to be useful in the past as students are exposed to a computer course. In the advanced world of teaching and learning today, many countries however find that this is no longer sufficient to optimize the potential of ICT in education. Under this backdrop, Frost and Sullivan (2010) therefore advocate for the newer and intelligent use of ICT which is *Policy on ICT in Education* requiring the amalgamation of ICT with education making ICT as the enabler of education. This is because ICT knowledge on its own will not produce better students with enhanced creativity, innovation, and education outcomes.

The vision for Thailand on the National Education Act of 1999 stipulates that the reform of learning will lead to lifelong learning, and bring about the realization of the emerging pedagogical paradigm via the use of ICT (Downes et al. 2003). The country report notes that ICT play a key role in education with a major goal being to promote, develop and support the use of technologies in education. Relating to curriculum development in Thailand, Downes et al. (2003) contend that national reforms are underway across the entire school curriculum which encourages the use of ICTs.

In the African continent, the adoption of ICT policies by nations also faces some challenges as in the Asia Pacific region. Some governments use and bottom-up and participatory approach, while others focus on the top-down approach where the ministries determine what needs to be done and those in the grassroots expected to implement. Yusuf (2005) holds that the Nigerian Government in October 1999 issued a document on Telecommunications Development Strategy and Investment Opportunities. This paved the way for the National Policy on Telecommunication in Nigeria to be approved in October 1999 (Ajayi, 2002). The document contained policy statements on objectives, structure, competition policy, satellite communication, management structure, finance and funding, manpower development and training, internet, research and development, safety and security, international perspectives, and policy implementation and review (Federal Republic of Nigeria, 2000).

The Nigerian National Policy on Information Technology recognized the need to use Information technologies for education. Based on its vision, the document stressed that information technology must be used to empower the youth with IT skills and prepare them for global competitiveness; integrate IT into the mainstream of education and training; establish

new multifaceted IT institutions as centres of excellence to ensure Nigeria's competitiveness in international markets; restructuring the education system at all levels to respond effectively to the challenges and imagined impact of the information age and in particular, the allocation of a special IT development fund to education at all levels (Federal Republic of Nigeria, 2001). Yusuf (2005) regrets the fact that mission's general objectives and strategies recognized the importance of ICT in education, but the document has no sectorial application to education. Issues relating to education are subsumed under sectorial application for human resources development.

The sectorial application objectives focused on education intends 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 IT. To build knowledge and skills in information technology, the strategy aimed at making the use of ICT mandatory at all levels of educational institutions; develop ICT curricular for primary, secondary, and tertiary institutions; use ICT in distance education; making ICT companies investment in education; issue study grant and scholarship on ICT; training the trainer scheme for National Youth Service Corp members, working with international and domestic initiatives for transfer of ICT knowledge and so on (Federal Republic of Nigeria, 2001).

As far as public governance authorities and other stakeholders in the promotion of ICTs for development is concerned, Tamukong (2007) contends that the Nigerian national policy on ICT followed the participatory approach with government working with other fundamental stake holders to come up with the policy and to assist in its implementation. On Information and communication infrastructure, the national policy on telecommunication was a key step in the development of infrastructural base for ICT in Nigeria. The Federal Government of Nigeria in 2001, approved the Nigerian National Policy for Information Technology, and followed this up with the establishment of the National Information Technology Development Agency (NITDA), which was charged with the implementation of the policy (Ajayi, 2002). Although the issue of infrastructure is implicit in the present policy, it should be reviewed in such a way that access policy is addressed in concrete terms, since this is important in ICT integration. Infrastructural needs must be addressed across zones and school levels in Nigeria (Yusuf, 2005).

Relating the policy to curriculum development, Yusuf (2005) contends that in spite of these objectives and strategies that are focused on education, the document is inadequate to

cater for the needs of the country's education system. He enumerated the following deficiencies in the document: the Nigerian policy has no specific special application to education. While there are sectoral applications for health, agriculture, art, culture, tourism; and governance, education is subsumed under human resource development. Second, the objectives and strategies related to education as reflected in the sectoral application for human resource development are market driven. To Cloke& Sharif (2001), students are only being prepared to acquire knowledge and skills for future jobs.

The focus is only on learning about ICT, whereas for primary and secondary schools the focus is regarded as the early stage of ICT use in education. To them, this philosophy limits the potential of ICT in education to a central force in economic competitiveness. Culp, Honey & Mandinach (2003) on their part regret that the potentials of ICT as a tool for addressing challenges in teaching and learning and as change agent are thus neglected. Students need not learn about computers only; ICT should be integrated for the development and management of teaching and learning in Nigerian schools (Yusuf, 2005). Third, teachers are indispensable for successful learning about ICT, and learning and teaching through ICT. The Nigerian national IT policy is silent on teacher education and teachers' ICT professional development (Culp, Honey & Mandinach, 2003). The national policy does not also recognize the need to create quality software. The available software in Nigerian schools is imported with no local content. The policy document does not address this issue (Yusuf, 2005).

The Nigerian national policy does not give any guidelines on school technology plans. The implications of these inadequacies are that the national policy cannot adequately take care of the need of the Nigerian education system. Its educational focus is limited to the market driven goal. The need for integration in teaching and learning, the need for quality professional development programs for pre-service and serving teachers, research, evaluation and development, and the development of local context software are not addressed. These are major components of quality ICT application in education. In view of these inadequacies, there is a need to revise the Nigerian national policy for information technology. Such revisions should be undertaken to involve stakeholders in the area of education so that they can ensure that the policy covers issues related to learning about ICT and learning through ICT. The integration of ICT into every aspect of teaching and learning should also be the key focus.

Since teachers are vitally important to ICT integration in education, the national policy on IT should address the issue of teachers' professional development. This should incorporate issues relating to teacher training institutions and ICT, pre-service teacher education, in–service

teacher education, and standards for teacher competence and certification in ICT. Since research, evaluation, and assessment are critical for ICT usage in education, the national policy should identify a frame of reference in order to gauge success of ICT application in education. Such a frame of reference will encourage refinement of school practices relating to ICT integration (Yusuf, 2005).

In Rwanda, the Ministry of Education put in place Rwanda's Vision 2020 which aims to transform the country into a knowledge-based, technology-led and middle-income society by the year 2020. Information and Communication Technology is considered as a ubiquitous tool that will energize the country socio-economic development (Ministry of Education Rwanda, 2015). Based on the Information and communication infrastructure, the government of Rwanda and its partners participate in the provision of ICT infrastructure as well as training for teachers. The Rwandan project envisaged that enhancing teacher capabilities in and through ICT is one of the strategies used by the Government to develop a high-quality skills and knowledge base, leveraging ICT across various socio-economic sectors of the country.

To enhance curriculum development to integrate ICTs, the ministry of education envisaged training of teachers in ICTs to increase the resource base and improve education delivery at all levels, hence the need to institutionalize ICT usage and training for all teachers (Ministry of Education Rwanda, 2015). The Rwanda ICT Essentials for Teachers provides benefits for both educators and learners in education for improved teaching and learning processes to better learner outcomes, from increased learner engagement to seamless communication with educators which provides robust opportunities that ICT offers for the social development of knowledge based-economies for education (Ministry of Education Rwanda, 2015)

Concerning the role of public governance authorities and other stakeholders in the promotion of ICTs for development, the government of Rwanda through the Ministry of education collaborated with other partners like UNESCO, CISCO, INTEL, ISTE and Microsoft to foster their ICT vision (Ministry of Education Rwanda, 2015). Tamukong (2007) holds that based on its ICT policy, the government of Rwanda regulates the ICT sector, mobilize resources and provide funding, while the private sector provides investment and business leadership (Tamukong, 2007). Rwanda ICT Essentials for Teachers is based on the UNESCO ICT Competency Framework for Teachers, a framework that outlines the competencies that teachers need to integrate ICT into their professional practice. The Rwanda ICT Essentials for Teachers draws from a set of competencies clustered around 6 major education focus areas and

focuses on the Technology Literacy growth phase of knowledge acquisition. These were: understanding ICT in education; curriculum and assessment; pedagogy; ICT; organization and administration and teacher professional learning (Ministry of Education Rwanda, 2015).

Writing on the integration of ICTs in education in Cameroon, Josué (2007) presents some outstanding issues on the vision. In 2004, key strategies on using ICTs in education in Cameroon 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 Economic Commission for Africa (UNECA) and United Nations Development Program (UNDP). In this document, the government of Cameroon recognized ICTs as a national priority along with education, health, forestry and governance. In this NICI plan, the government of Cameroon 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 sectorial 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).

This policy plan if implemented would have provided the technical knowledge and facilities needed by teachers to assist them integrate electronic media in the teaching-learning process. This non-implementation made Mbangwana (2008) to conclude that Cameroon lacks a concise policy on the integration of ICTs in the teaching-learning process. This has made the provision of ICT infrastructure, training of teachers on the integration of ICTs haphazard and difficult. Josué (2007) regrets that it is rather unfortunate this policy plan has not yet been implemented. This has led to a highlight of numerous barriers to the effective integration of electronic media in Cameroon educational system as he highlighted. These are; limited or poor information infrastructure, lack of or inadequate ICT facilities in schools, frequent electricity interruption, non-integration into the school curriculum, poor ICT policy and project implementation strategy, inadequate ICT manpower in the schools, high cost of ICT facilities or components, limited school budget, lack of or limited ICT skills among teachers, lack of or poor perception of ICTs among teachers and administrators, inadequate educational software, poor management on the part of school administrators and the government, lack of maintenance culture and lack of interest in ICT application or use on the part of students.

At the level of providing ICT infrastructure, the situation especially in primary teacher training colleges in Cameroon still needs much to be desired. Though the government of

Cameroon has made efforts to create multimedia resource centres in some secondary schools and state universities in Cameroon, this is not the case with primary schools and teacher training colleges. For example the Cyber Education Project in Secondary Schools saw the establishment of 17 Multi Media Resource Centres (MRC) in government secondary schools by 2007, trained 54 monitors of MRCs in 2006, gave 60,000 students access to computers, established the learning platform for secondary education, CAM-EDUC, trained teachers, directors and administrative staff of secondary education on ICTs (Josué, 2007). In similar perspective, most of the initiatives from partners to bring ICTs into education in Cameroon centres around secondary and higher education, without involving primary schools and primary teacher training colleges.

Also, such projects also mostly involve schools in urban areas to the detriment of students in rural areas. For example, the project of the computer and Internet Access Centres (CIAC) implemented by the Association for Development, Communication and Environment (ADCOME), between 2005 and 2008 installed 1,280 computers in 37 secondary schools for 56,239 students (Nganji, Kwemain & Taku, 2010). Parents as important stake holders of the education community have joined the government and other non-profit making organizations as individuals or through Parent Teacher Associations to provide computers and other accessories to most secondary schools. This is in the form of donations and special levies charged by the Parent Teacher Associations for the acquisition of computers. Such initiatives have unfortunately recorded setbacks due to embezzlement and misappropriation of the funds by those entrusted for its management.

In the views of Mbangwana (2008), access to ICT by students and teachers has begun, yet its use supports traditional teaching rather than the shift to new roles and pedagogical practices. The National Agency for Information and Communication Technologies (NAICT) responsible for the putting in place of an ICT policy infrastructure in Cameroon under the direct supervision of the Presidency of the republic in its report admits that the computer/student ratio in the higher education sector is relatively very low, thereby being unable to support a favourable training environment on ICTs usage for all the students. So, less than 5% of these students use ICTs in the learning process. It further holds that most of the lecturers don't have any training on the ICT domain and that the use of ICTs on improving the teaching and learning processes is still very rudimentary in the educational system in Cameroon.

Most of the web sites are static, providing no interactive services to users and some with obsolete contents; virtual absence of didactic materials, un-computerised management and

guidance systems, research centres and institutes are not well equipped with ICTs, scientific production is still rudimentary with no specific vision, and that the production and deployment of interactive didactic materials are completely absent in the educational system. The report holds that despite the numerous initiatives observed so far, the education sector may not be able to guarantee an adequate training in the mastery and usage of ICTs by her citizens which is necessary in order to be competitive in the emerging global knowledge society (Republic of Cameroon, 2007c).

In the domain of curriculum development, several developments have been made at the level of curriculum with the aim to integrate ICTs. ICT was introduced in nursery and primary schools and primary teacher training colleges in Cameroon in 2007 with the syllabuses published in September 2008 (Nkwenti, 2012). In 2013, the Ministry of Secondary Education came up with new syllabuses for primary teacher training colleges which included two subjects: ICT and Didactics of Educational Technologies that were meant to train teachers on computer awareness and integration of ICTs in planning and presenting lessons in other subject areas in the curriculum of the primary school (MINESEC, 2013). Nkwenti (2012), looking at the distance covered so far, holds that National Sequential Schemes of work were published in 2008 and 8 textbooks were written and validated by the National book commission to facilitate the teaching of ICT. Also, 96.23% of public schools now teach ICT to primary school pupils though 87% of the teaching is theory; 100% of Teacher training colleges teach ICT to student teachers though 55% of the teaching is theory.

Furthermore, on the request of the Ministry of Basic Education, Higher Teacher Training College (ENS) now train ICT teachers and the first batch posted to Government Teacher Training Colleges (G.T.T.C.) in 2009 to boost the training of primary school teachers on ICT integration. The subject ICT was tested in the 2010 and 2011 sessions of examinations organized by MINEDUB with all candidates for CEP, FSLC and CAPIEMP taking the optional paper with a performance of 61% in 2010 and 68% in 2011. All holders of CAPIEMP from G.T.T. Cs since 2009 have ICT knowledge though with limited practical skills. He however regrets that only 3% of public schools have access to limited ICTs thus teaching remains purely theoretical. Since 2008 when the official syllabus went operational, only 1.2% of in-service teachers have been trained on the practical use of ICT though 67.2% have theoretical skills through pedagogic day trainings (Nkwenti, 2012).

Based on the above analysis, it is obvious that the putting in place and effectively implementing a concise ICT policy is an issue in developing countries even though the

respective governments, supported by some international organizations are making efforts towards providing a framework and resources to enhance the integration of ICTs in pedagogy in their respective countries. Their approaches however differ based on certain strategic technical and financial challenges. Some adopt the much-recommended participatory bottom-up approach to decision making while others adopt the top-down approach. From the analysis, it can be deduced that a good ICT policy needs to be drafted based on a participatory approach with all stake holders involved, the policy needs to identify who provides ICT infrastructure, which ICT infrastructure is required, what form of training should be given to teachers on the integration of ICTs in the teaching-learning process, how and when supervision and evaluation of implementation of such a policy should be done and by whom and how updates shall be made. Such a national policy should also stipulate a holistic approach for providing ICT resources and training that will cover schools and teachers in both rural and urban areas and cut across primary, teacher education, secondary and higher education sectors.

It also requires fundamental curriculum change or development that will influence the teaching methods and approaches used by teachers. Mbangwana (2008) reiterates that Policy implications in Cameroon include the need to develop expertise within the nation, provide training opportunities, and encourage initiative and innovation on the part of teachers. He therefore calls for re-conceptualizing and restructuring the educational enterprise, so as to confront the technological challenges of this millennium. With rapid changes within society and radical transformations in the way people acquire knowledge, new teaching paradigms are required, ones that tune educational systems to modern times.

2.1.2. The rapid trend of Information and Communication Technology program in the World

Information and Communication Technology (ICT) refers to a broad field encompassing computer, communications equipment and the services associated with them (Lallana & Margaret, 2003). Tinio (2003) defines ICT as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. Mbangwana (2008) on his part sees ICT as technologies arising from scientific and technological progress in computer sciences, electronics and telecommunications which enable us to process, store, retrieve and disseminate valuable information in text, sound and video form. From a broad perspective, ICTs include long-used, non-digital technologies such as writing, printing, drawing and painting. But in the late 20th century electronic means of

communication like the telephone, television and digital media such as computers and the internet have dominated public perception of communication technology (Husain, ND).

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2003), ICT refers to the tools and the processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programs, database programs and multimedia programs. Tamukong (2007) citing the Zambian policy definition considers ICT as a generic term used to express the convergence of technologies and information services in telecommunications, information management, broadcasting; and the use of such technologies in the delivery of social and economic products and services at all levels of society.

These definitions highlight that ICT is related to the variety or collection of technologies and applications, which may include hardware such as computers and other peripheral devices or software and connectivity like access to the Internet, local networking infrastructure, video conferencing and other applications. The definitions also indicate that ICTs include 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. The definition from Tamukong (2007) also highlights the fact that ICTs are applied in other domains of life, and not only in education to achieve expected outcomes. This could be in the health services, the military, and transport sectors.

According to Clarke (2006), ICT is not just considered as applications and systems but also as skill for life. To him, it is viewed in this regard, in line with literacy and numeracy as a fundamental skill that every individual needs so as to live confidently, effectively and independently in a modern or contemporary society. Tanner (2003) and Kennewell (2004) support the view that ICT is a key skill for learning different subject areas. This means that ICT can be used across the curriculum for skill development. In the teacher training college, ICTs will therefore be instrumental in enhancing the acquisition of lesson preparation, presentation and evaluation skills as well as communication skills. ICT can be an instructional medium or a source for learning. It can also be integrated in the learning process so that learning takes place through the learner's interaction with the facilities.

Furthermore, the Asian Development Bank-ADB (2009) report on good practices for education and communication technology for education presents three salient benefits integrating ICTs in education. According to the report, Investments in ICT for education at the higher educational level support the development of a skilled, ICT-capable labour force that may attract direct foreign investment, as well as research and development activities and university–private sector links that are important drivers of innovation and growth in advanced economies. ICT capability involves technical and cognitive proficiency to access, use, develop, create, and communicate information appropriately, using ICT tools. Along with having the potential to enhance teaching and learning in the classroom, ICTs in education have the potential to:

- Encourage open communication between and among students, faculty, and others that supports active learning and knowledge construction;
- Make available information and resources supporting academic research that would not be accessible otherwise;
- And foster development of learning materials, presentations, and lectures in an interactive manner that allows faculty to deliver them to and share them with students directly.

ICT in education therefore is considered as a discipline, resource and key skill (Adesote & Fatoki, 2013).

The domain of ICTs comprises several tools including calculators, telephones, tablets, computers, printers, Dictaphones, cameras, overhead projectors, interactive white boards, data storage tools such as compact discs, flash drivers, memory cards, and online learning platforms (Ngoungouo, 2017). In a study on the use of ICTs in Cameroon school system, Ngoungouo (2017) holds that teachers use computers, telephones, calculators, internet for lessons preparation; they use projectors, computers, calculators for lessons delivery and use the computer and printers for question paper production, examination, marking and filling of report cards.

ICT and its applications can be used for many different purposes in the field of education. Muianga (2019) in his review on the role of ICT in the shift towards student-centered learning examined the following purposes of ICT in education. The first is that 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 personalized, emotive, creative, flexible and dynamic. For instance, ICT is used to support all educational activities in the pedagogical activity of e-learning. This includes hardware such as computers and mobile phones, and also software such as email, chat and learning management systems.

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 activities related to the organizational aspects of the institution. Fourthly, ICT can be used to enhance the creation of research networks and it has contributed to the modernization of academic library services. Our focus on ICT in this study cuts across these purposes. This is based on the fact that ICT and Didactics of Educational Technologies as subjects in the teacher training program aims at enabling student teachers develop skills in integrating ICT in teaching and consequently sustain pedagogical activities that ensure effective teaching and learning.

Akudolu (2007) posits that ICT has three positions in the curriculum and these include learning about ICT, learning with ICT and learning through ICT. Learning about ICT refers to ICT concept as a subject of learning in the school curriculum while learning with ICT is concerned with the use of ICT as a medium to facilitate instruction. Learning through ICT refers to the integration of ICT as an essential tool into a course/Curriculum, such that the teaching and learning of that course/curriculum is no longer possible without it. The integration of ICTs in the teaching-learning process is thus expected to cover these three positions for effective teaching and learning to occur. Akudolu (2007) however regrets that most schools do not provide Information and communication technologies for teaching. When such happens in teacher training colleges, it becomes difficult for student teachers to acquire the skills in integrating ICTs in lesson planning, presentation, lesson evaluation and even skills in communication.

2.1.2.1. Essential Conditions for the Integration of Information and Communication Technology in the teacher training colleges

Mukuna (2013) presents a summary of conditions necessary for the integration of ICTs into pedagogical practice. These conditions are as follows:

Firstly, a shared vision for technology integration: This vision should be shared by the school, district, county and nation at large. Educational leaders must view ICTs as a core value. ICT policy plan should be grounded on a shared vision of teaching and learning on the one hand and ICT integration on the other hand (Fishman & Pinkard, 2001). The planning for

integration of ICTs into the curriculum should involve all the stakeholders who are parent, community leaders, school management committees, district and county teachers. Teachers in schools which have an explicit ICT policy plan that stresses shared goals use educational technology more regularly in their classroom (Tondeur, Van Keer, van Braak, & Valcke, 2008). There is need to increase the technology budget; and teachers should be trained in integrating ICTs into the classroom and linking technology to curriculum needs.

Secondly: empowerment of leaders. stakeholders at all levels must be informed about the goals of the community, district, county and school. According to Dexter (2008), ICT leadership must be considered as a school-level property rather than being simply associated with a particular leadership role because of the multiple leaders. This includes persons like the school leader or principal, the ICT coordinator and teacher leaders who are typically involved in a school's ICT leadership. Research on leaders' impact on teaching practice and student achievement by Leithwood, Louis, Anderson & Wahlstrom (2004) has proven that effective leaders employ three broad categories of leadership practices which include: setting direction, developing people and making the organization work. These leadership practices encourage teachers to integrate ICTs in teaching.

Thirdly, Standards and curriculum support: the content area and technology should be designed to complement each other; Required Policies: There need to be policies that ensure appropriate behaviour, safety, equitable treatment of all students, financial assistance incentives and accountability; and access to hardware, software and other resources for sustainable integration must be ensured.

Fourthly, skilled personnel and opportunities for Competence development – pre-service training should have a component of integration of ICTs into the classroom practices. However, since technology keeps changing continuing staff development is an essential condition for effective technology integration. Achankeng (2014) mentioning the seventh strategy of the Ministry of Basic Education's vision on training towards the integration of ICTs supports the view that appropriate training must be provided to teachers before they attempt to introduce the use of ICTs in classrooms. Schools must have a plan for continuous professional development for teachers, administrators, technicians, to name these, not only to learn the latest technology, but more importantly the most effective pedagogy related to integrating the technology into teaching and learning in the classroom.

Fifthly, Technical assistance: Technical support and maintenance for students and teachers is crucial and must be considered; appropriate teaching and assessment approaches must be put in place; and engaged communities: partnerships and collaborations Mukuna (2013). Figure 2 below shows that ICT integration takes so many points into consideration. Some of them are required policies, Technical assistance, a shared vision etc

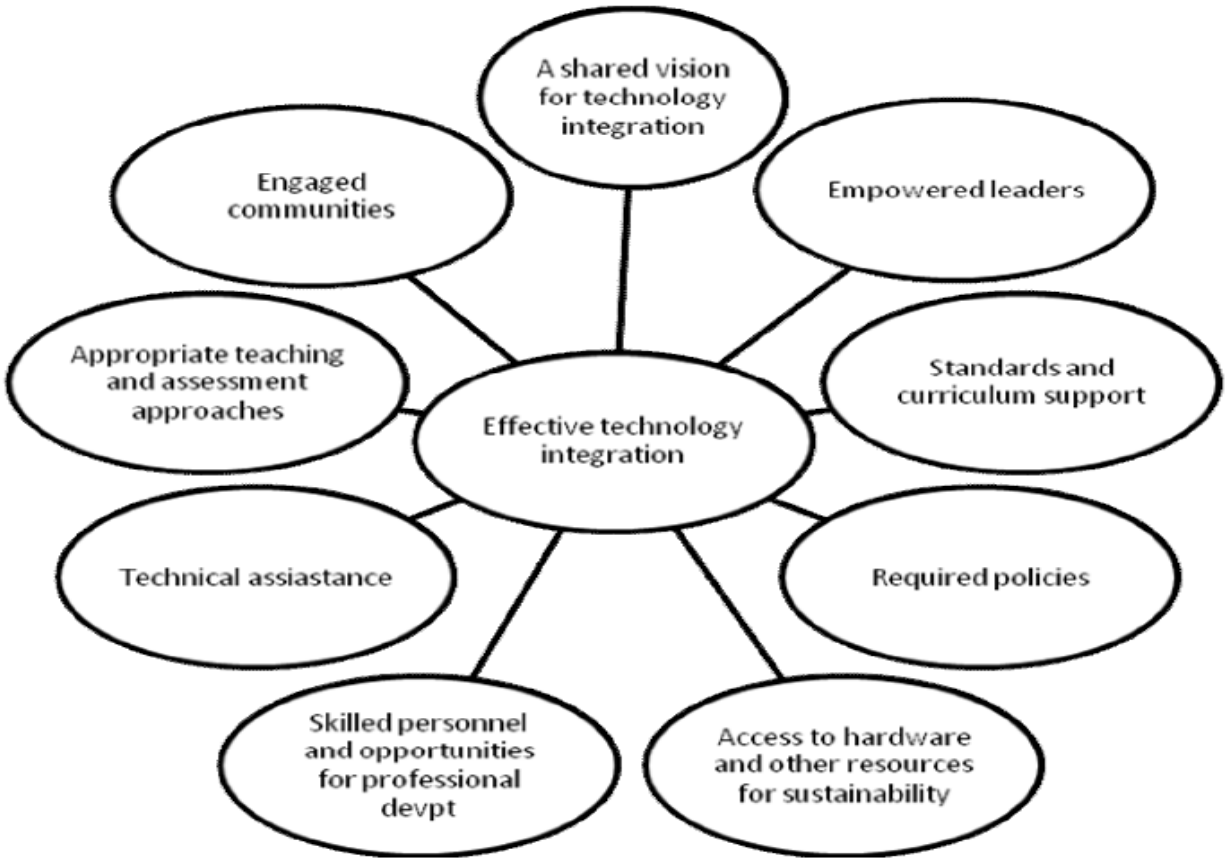


Figure 02: Effective Technology Integration

Source: Mukuna (2013)

2.1.2.2. Different Ways Teacher Trainers use ICTs to Train Student Teachers

How teachers use ICTs is dependent on their general teaching styles. Types of usage of ICTs correlate with teacher pedagogical philosophies (Trucano, 2005). Teacher trainers use diverse approaches to integrate ICTs during teaching, while training student teachers. Tinio (2003) presents three main approaches for integrating computer, internet and other accessories in the teaching-learning process. These approaches are:

i. Learning about computers and the internet, in which technological literacy is the end goal;

ii. Learning with computers and the internet, in which the technology facilitates learning across the curriculum;

iii. Learning through computers and the internet, integrating technological skills development with curriculum applications.

In teacher training colleges in Cameroon today, ICT and Didactics of Educational Technologies have been introduced as subjects in the new syllabuses for the training of student teachers (MINESEC, 2013). A look at the content of these subjects, it shows that both subjects though independent, are inter-linked in preparing student teachers on ICT awareness and on integration. While the content on ICT is mostly centred on building the student teacher's computer awareness skills, it has a section on lesson planning, that emphasize the training of student teachers on how to integrate ICTs in drawing up and executing lesson plans. Didactics of Educational Technologies on its part is more focused on grooming student teachers on how to select, integrate and use these ICTs to draw lesson plans and teach content in other subject areas (MINESEC, 2013).

These two subjects cover Tinio's notion of learning about ICTs and Learning through ICTs. The fundamental problem realised by experience is that most of the teacher trainers themselves lack the knowledge and skill in using these ICT tools in teaching as most of them were never effectively trained on this. Some teacher trainers handling the other subject areas and who are knowledgeable in ICTs use some to facilitate the presentation of their lessons to student teachers like computers, projectors, and internet. This covers the notion of teaching with ICTs. These three main approaches of use expose student teachers and enhance their skills in the integration of ICTs in the teaching-learning process.

In learning about ICTs, the technological literacy of student teachers is enhanced as they are exposed to fundamentals such as basic terms, concepts, and operations. They also learn the use of the keyboard and mouse, use of productivity tools like Word Processors, spread sheets, database and graphic programs, use of collaboration tools like search engines and Email, developing an awareness of the social impact of technological change and so on (Tinio, 2003).

Learning with ICTs focuses on how the technology can be used as the means of learning across the curriculum. This involves the presentation, demonstration and manipulation of data using productivity tools; use of curriculum-specific applications like educational games, drill and practice, simulation, tutorials, virtual laboratories, visualizations and graphical

representations of abstract concepts. It also involves the use of information and resources on CD-ROM or online like encyclopaedia, interactive maps, electronic journals and so on. Tinio (2003) however adds that technological literacy is required for learning with technologies to be possible, implying a two-step process in which students learn about the technologies before they can actually use them to learn.

Learning through ICTs combines learning about them and learning with them. This involves learning the technological skill as the learner engages in a curriculum activity. For example, when student teachers are given an assignment to gather and summarize content to plan a particular lesson, as the search on the internet and use Word Processors and other software, they are consequently learning through these ICTs. The following lessons were learned by the researchers about the role of ICT in continuous training:

- At the epistemological level, the researchers learned that ICT tools have to balance the theoretical approach typical of university and research context with the practical needs of the industrial world. The project suggests that ICT tools should help people to acquire autonomous learning capability;
- At the methodological level the researchers found out that materials and approaches proposed should take into consideration the practical context where they have to be employed. The project proposed that different approaches to training should be integrated in a single context: in face to face, autonomous, and distance under the guide of the teacher or in collaboration;
- At the social assistance level, the researchers found out that Infrastructure have to be realized for technology-based training to effectively take place (Bottino and Chiappini et al., 2004).

Bottino and Chiappini et al. (2004) concludes that the combination of theoretical aspects with practical experience and application to real problems helps users to acquire self-confidence, understand problems and tackle tasks successfully. Also, users learned that practicing with and without the guide of someone else are a valuable help for learning. They also learned that autonomous learning capabilities are the basis for personal growth while working in a group is difficult but presents advantages for learning. Lifelong learning requires autonomous learning activity. Different approaches to learning must be adopted. Motivation and the capability of cooperating with colleagues is central. The project showed that the web and multimedia technology effectively give the possibility of realizing continuous training

experiences. It suggests that practical conditions like management, technology, maintenance must be guaranteed to make the use of ICT for training effective.

2.1.2.3. Educational policy on ICT program for teachers' Competence development.

According to UNESCO (2018), the ICT Competency Framework for Teachers (CFT) version 3 provides a comprehensive set of competencies teachers need to integrate ICT into their professional practice in order to facilitate students' achievement of curricular objectives. This framework holds that contemporary societies are increasingly based on information and knowledge, and the ubiquity of technologies. Consequently, societies need to put in place mechanisms to build workforces that have information and communications technology skills and are reflective, creative and adept at problem-solving in order to generate knowledge. Version 3 of the ICT CFT takes into account the agenda 2030 for Sustainable Development, designed to preserve those competencies that remain relevant and to frame them within the current advances in technologies and the changing demands of life and work.

According to UNESCO (2018), the ICT CFT Version 3 is intended to inform teacher-training policies and programs to strengthen the use of ICT in Education. Its target audience is teacher-training personnel, educational experts, policy-makers, teacher support personnel and other professional development providers. The ICT CFT assumes a working knowledge of the benefits of ICT in Education and encourages contextualization and adaptation of teacher professional development as relevant. This competency framework emphasizes that teachers, in addition to having ICT competencies and the ability to develop these in their students, must be able to use ICT to help students become collaborative, problem-solving, creative learners and innovative and engaged members of society. For this purpose, teachers' professional development should be understood as a lifelong learning process, rather than a one-off event.

The ICT CFT should be integrated into the three phases of teacher professional development which consist of pre-service - focusing on initial preparation on pedagogy, subject matter knowledge, management skills and use of various teaching tools including digital tools and resources; in-service - including structured face-to-face and distance training opportunities building upon pre-service programs and directly relevant to teaching needs in classrooms and beyond; and finally, on-going formal and informal pedagogical and technical support, enabled by ICTs, for teachers' innovative use of ICT to address daily needs and to facilitate students' higher-order learning (UNESCO, 2018). The new syllabuses for teacher training colleges in

Cameroon (MINESEC, 2013) with ICT and Didactics of Educational Technologies included is aimed at ensuring this pre-service phase of training in the integration of ICTs in pedagogy.

Observation and experience however show that teacher trainers themselves are not effectively trained to exploit these two subjects adequately. In-service training as well as formal and informal pedagogical and technical support after training still remains a great challenge in our primary education sector. The ICT CFT consists of 18 competencies organized according to the six aspects of teachers' professional practice, over three levels of teachers' pedagogical use of ICT as shown on figure 1. The underlying idea is that teachers who have competencies to use ICT in their professional practice will deliver quality education and ultimately be able to effectively guide the development of students' ICT competencies. The six aspects of a teacher's professional practice addressed are: understanding ICT in Education Policy; Curriculum and Assessment; Pedagogy; Application of Digital Skills; Organization and Administration; and Teacher Professional Learning.

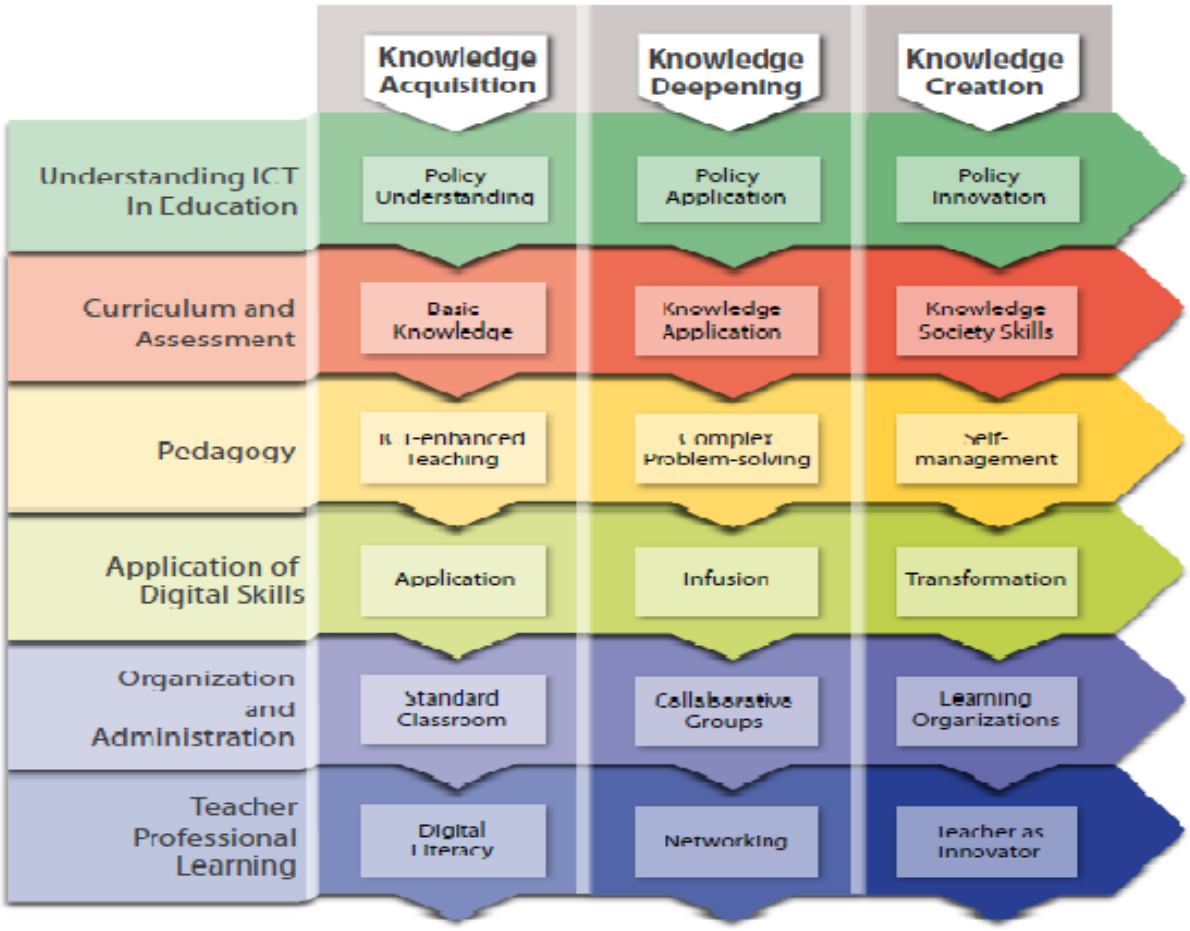


Figure 03: Levels of Teachers' Pedagogical use of ICT, Competences and Teachers' Professional Practice

Source: UNESCO (2018)

The ICT CFT is organized over three successive stages or levels of a teacher's development in making pedagogical use of ICT. The first level is Knowledge Acquisition**,** where teachers acquire knowledge about using technology and basic ICT competencies. The Knowledge Acquisition level demands that teachers be aware of the potential benefits of ICT in the classroom and within national policies and priorities to be able to manage and organize the school's ICT investments and use technology to embark on lifelong learning and further professional development.

Teachers who have mastered the competencies in the Knowledge Acquisition level can: articulate how their classroom practices correspond to and support institutional and/or national policy; analyse curriculum standards and identify how ICT can be used pedagogically to support attainment of the standards; make appropriate ICT choices to support specific teaching and learning methodologies; identify the functions of hardware components and common productivity software applications, and be able to use them; organize the physical environment to ensure technology supports different learning methodologies in an inclusive manner; and use ICT to support their own professional development. A look at the new syllabuses for ICT and Didactics of Educational technology (MINESEC 2013) is focused on this vision.

The second level is Knowledge Deepening, where teachers acquire ICT competencies that enable them to facilitate learning environments that are student-centred, collaborative and cooperative in nature. Teachers are also able to link policy directives with real action in the classroom, have the capacity to build technology plans to maintain the school ICT assets, and forecast future needs. In addition, teachers can study further by linking to national and global teacher networks. Teachers who have mastered the competencies in the Knowledge Deepening level can: design, modify and implement classroom practices that support institutional and/or national policies, international commitments like UN Conventions, and social priorities; integrate ICT across subject content, teaching and assessment processes, and grade levels, and create a conducive ICT-enhanced learning environment where students, supported by ICT, demonstrate mastery of curriculum standards; design ICT-supported project-based learning activities and use ICT to facilitate students to create, implement and monitor project plans, and solve complex problems; blend varied digital tools and resources to create an integrated digital learning environment to support students' higher-order thinking and problem-solving skills; use digital tools flexibly to facilitate collaborative learning, manage students and other learning partners, and administer the learning process; and use technology to interact with professional networks to support their own professional development (UNESCO, 2018).

The third level is based on Knowledge Creation, where teachers acquire competencies that encourage them to model good practice, and set up learning environments that encourage students to create the kind of new knowledge required for more harmonious, fulfilling and prosperous societies. Teachers who have mastered the competencies in the Knowledge Creation level can: critique institutional and national education policies alike, suggest revisions, design improvements and speculate on the impact of these changes; determine how best to incorporate student-centred and collaborative learning to ensure mastery of multidisciplinary curriculum standards; while determining learning parameters, encourage student self-management in student-centred and collaborative learning; design knowledge communities and use digital tools to support pervasive learning; play a leadership role in devising a technology strategy for their school to turn it into a learning organization; and continually develop, experiment, coach, innovate, and share best practice to determine how the school can best be served by technology.

2.1.2.4. Advantages of Integrating ICT in the Teaching Learning Process

One will ask why governments spend huge sums of money to invest on the integration of ICTs in the teaching-learning process. Research supports several advantages for the integration of ICTs to pedagogy. Mbangwana (2008) contend that ICT, when appropriately used, can serve as a vehicle and a platform for meaningful educational reform geared towards a shift from didactic instructionism to constructivism. This implies that the effective integration of ICT will enable learners construct knowledge rather than passively relying on the teacher's instruction. Zwaneveld & Bastiaens (2010) citing Baars, Wieland de Ven & Jager (2006) present two forms of advantages of the use of ICT in teaching.

The first is organisational advantages which are time-and place-independent teaching, easy updating of materials, cost-effectiveness by automation of (some) teaching activities. The second form of advantage consists of better communication, internationalization, teaching just in case and just in time, bridging visual, motorial or auditive disadvantages. These authors postulate seven starting points for the use of ICT in teaching which include better collaboration between students, active learning, direct feedback, a lot of interaction between teachers and (fellow) students, possibilities for different learning styles, learning in context and a great variety of working in classroom.

According to the Asian Development Bank-ADB (2009), ICT when integrated in the teaching-learning process has the potential to bridge the knowledge gap in terms of improving

quality of education, increasing the quantity of quality educational opportunities, making knowledge building possible through borderless and boundless accessibility to resources and people, and reaching populations in remote areas to satisfy their basic right to education. The ADB (2009) report further holds that ICTs enable access to and use of information that may not be commonly available in certain contexts, thus providing teachers with content they would not have had otherwise to engage their students. In addition, teacher training in ICT for education parallels training in teaching methodology that supports student-centred learning.

Hence, investments in ICT for education are likely to lead developing countries toward educational reforms that are necessary for fostering an information-literate citizenry, which is the key to competing in the global economy. ICTs have the potential to improve the teaching and learning process by enabling students to access information and engage in interactive learning experiences that would not otherwise be available to them. Such ICT-enhanced classroom experiences have the potential for encouraging student-centred learning, allowing students to be active learners who construct knowledge rather than passively receiving information. As a further pedagogical development, ICT can support evolution from the student-centred approach and the use of interactive technology to team-centred pedagogy and the use of collaborative technology. In this context, the focus is evolving from ensuring appropriate learning styles to ensuring an appropriate learning environment.

2.2.0. PLANNING NORMS

According to Yangsi (2014) planning norms in Cameroon are classified into legislative and regulatory texts which define rules of general conduct. These texts include; the constitution, international instruments, laws, ordinances, decrees, orders, decisions, instructions, or directives. These texts are therefore further classified into internal or national and external or international instruments. The program ICT planning for professional development is guided by both national and international instruments.

2.2.1. National instruments

The constitution is the '*main law of the country'*, supreme law of the country or the '*Grand Norm'* and it can be referred to as a series of fundamental principles which is used by a state and is acknowledged by the governed (Yangsi, 2014). It is the constitution that validates laws, ordinances, decrees, orders, decisions, instructions, or directives as well as permit for international instruments to be ratified by the parliament and signed or promulgated by the President of the Republic. The revised 1996 constitution of the Republic of Cameroon in

articles 22(f), 55(2), clearly state the role of the state in educational planning and implementation. It also gives the Head of State the prerogative to define educational policy planning. It is for this reason that the His Excellency President Paul BIYA, promised the integration of Information Communication Technologies (ICT) into the Cameroonian educational system on the 10th of February 2001, while addressing the Cameroonian youths on the eve of the National Youth Day celebrations. And he later matches his word with actions by making it a policy that ICT is taught in Cameroonian schools especially TTCs (Ministry of Basic Education, September, 2007).

2.2.1.1. ICT program reforms

Presidential Decree on ICT use in Education laid a very strong foundation for ICT policy planning and implementation in the Cameroonian educational system as a whole and the teacher training colleges in particular. Based on the legal and regulatory framework, two presidential decrees of 2001 brought ICTs into the realm of education at all levels of schooling (Josué, 2007). From these presidential pronouncements, it was clear that imported computers and accessories were to be duty free for schools. There have been several national initiatives aimed at stimulating the use of ICTs, as a development tool to alleviate poverty and other challenging issues. These include:

Efforts of ICTs in Education made by Ministry of Basic education

The inspectorate of pedagogy in charge of computer science education in the ministry of basic education came up with a draft strategy for implementing the use of ICT policy in the Basic education sector in Cameroon during the years 2007-2012, with the first draft published by Michael Nkwenti Ndongfack, Inspector of Pedagogy in charge of Computer Science (Nkwenti, 2007; Achankeng, 2014).

The Ministry of basic education, in pursuit of a vision of 'quality technological driven education' committed itself to pursuing an environment where 'all pupils will attend schools which effectively use technology as a resource to support pupils learning and improve operational pupils efficiency', indeed one of the priorities identified is 'ensuring computer literacy in schools' in keeping with ANTIC National Policy document and the Head of State's vision of a technologically driven classroom as already manifested in the secondary education sector. This basic education sector strategy has been customised and fine-tuned to reflect this vision and address our sector needs. It should therefore be viewed as a framework to improve

the standard of education in this sector and to level the ground for other partners to participate in the development process.

To further elaborate the importance of integrating ICTs in education, Achankeng (2014) put forward the following vision and mission statement: An education system that produces pupils who are capable of functioning effectively in the information age as well as contribute meaningfully to its further development. To harness the potential of ICTs as a means of enhancing the administrative and teaching/learning processes towards a generation of a workforce compatible with the demands of the information age. The Ministry of Basic education reiterated the following objectives identified in the ICTs policy documents towards the optimal utilization of ICTs in the Basic education sector.

i. To promote equitable access to educational resources through the strategic application of ICT.
ii. Make all school leavers computer literate, thereby providing them with the requisite ICTs skills as a platform for eminent entry into specialised training for the information economy.
iii. Create a teaching force in which all practitioners possess the critical requisite skills and competences required to use ICT as a tool in enhancing the teaching/ learning process and a network of ICT teacher specialised.
iv. Improve the efficiency and effectiveness of educational administration through the promotion through the use of appropriate school management information system.
v. Exploit the interactive potential of information and communications technology in the provision of lifelong learning, anytime, anywhere via distance education program.
vi. Create smart partnership for a sustainable ICT program through collaboration amongst the public and private community sectors. (Achakeng, 2014).

MINEDUC's Effort and the Cameroon National Information and Communication Infrastructure (NICI) Policy and Plan

Based on the Presidential pronouncements of 2001 and the World Bank initiative, the Ministry of Education-Cameroon (MINEDUC) authorized 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 2001 (Josué, 2007). 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) plan by the government with the support of the United Nations Development Program (UNDP) and the United Nations Economic Commission for Africa (UNECA). In this document, the Government of Cameroon recognised ICTs as a national priority along with education, health, forestry and governance. Based on the NICI plan document, the government planned 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 sectorial 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 (didactical).

Josué, (2007) contends that these plans are currently being implemented in the framework of two projects: One on cyber-Education, being prepared by the Ministry Secondary Education and another that concerns higher education (universities and professional training schools). It is under this that the new syllabus for Teacher Training Colleges was developed. In June 2005, the Prime Minister of Cameroon signed a decree creating and organizing the sub-committee for the integration (République du Cameroun, 2005).

The implementations of the projects are done in collaboration with external partners and support from the President of the Republic. This implementation phase started in 2001and since then; the Government has signed some decrees to pave the way for the introduction of ICTs in education (Josué, 2007). In 2002, a ministerial decision was signed, defining the conditions for the creation of Multimedia Resource Centres (MRC) in government secondary schools. In 2003, a decree introducing ICTs in education was signed by the Ministry of National Education, now Ministry of Secondary Education. This document stated that ICTs would become an obligatory discipline as from September 2003. The Ministry of Secondary Education (MINESEC) was reorganized and a new unit added- *Cellulled'Appui ã l'Action Pedagogique* (CAAP), equipped with a distant training unit called *Unité de Formation ã Distance* (UFAD), expected to ensure the training and capacity building of teachers, including distant learning.

Implementation of ICT in educational reform will no doubt revolutionize educational research and administration, introducing a paradigm shift, but requires adequate research for pedagogical requirements (Anyaegbunem, 2013). Josué (2007) however holds that budgetary issues, weak linkages between stake holders and project management and coordination remains major factors hindering the smooth implementation of these projects at all levels. There is the absence of a specific board or organ in charge of coordinating the global cyber education project. This has led to the different stake holders trying to evolve independently of each other.

These government initiatives also lead to the designing of new syllabuses for Teacher Training Colleges in Cameroon involving ICTs, which is our area of focus in this work. Besides, these reflections did not directly affect primary teacher education until in 2013 that a diagnostic study on the quality of primary teacher education in the 21st century was influenced by the Ministry of Basic Education. The findings pushed the Ministry of Secondary Education under which primary teacher education had been placed to come up with new syllabuses for teacher training, that had important subjects like ICT and Didactics of Educational Technologies under the Department of Didactics of Sciences and Technologies.

2.2.1.2. ICT Reforms and Competence Development of Student Teachers in Cameroon

ICTs are diverse set of technological tools and resources used to communicate and create, disseminate, store and manage information, such as the computer, internet, radio, television, phones and so on (Tinio, 2003). ICT reforms on its part refers to pieces of legislation, policy statements made by the heads of state, educational authorities, international organizations and approved by the state, that lays down guidelines for the integration of ICTs in pedagogic practice. Josué (2007) contends that although the government officially introduced ICTs in schools in 2001, there is not yet any specific policy guiding their use in education in Cameroon. This has led to individual schools applying their own teaching methods or programs.

According to McCain, however, the use of technology in the classroom is not the critical issue that the education faces in the 21st century. The issue of foremost importance is to develop thinking skills in students so that they are able to utilize the potential of technologies to solve problems and to do useful work (McCain, 2005).Empirical studies have established that teachers' ability and willingness to use ICT and integrate it into their teaching is largely dependent on the professional development they receive (Davis, 2003; Pearson, 2003; Selinger

and Austin, 2003; Watson, 2001).Teachers should participate directly in content-specific professional development programmes aligned to the policy (Draper, 2011).

ICT can improve access to education, equity and the quality of teachers' professional development (Robinson,2008; Mervyn,2002). The teacher needs to be endowed with new skills in curriculum development and technology, lesson planning, class management, innovative teaching and evaluation strategies (Kibinkiri, 2014). According to Gurtas (2009:7), students need to develop twenty first century skills (technology and media literacy: effective communication; critical thinking; problem solving; collaboration) today in order to be able to become tomorrow's innovators. They must use those skills to work their way up the knowledge chain – to move from simply accessing and memorizing information to analysing and utilizing that information to innovate.

Diverse views have emerged on the role of ICT training on the professional development of teachers. Information and Communication Technologies (ICTs) which include radio and television, newer digital technologies like computers and the internet have been touted as potentially powerful enabling tools for educational change and reform. When appropriately used, ICTs help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by making teaching and learning an engaging, active process connected to real life (Tinio, 2003).

Also, Trucano (2005) contends that teacher training and continued on-going relevant professional developments are essential if benefits from investments in ICTs are to be maximized. The more teachers are trained on the integration of ICTs, the more their professional skills are enhanced and consequently will lead to great improvement in the quality of teaching and learning. He further adds that teacher training and professional development is seen as a key driver for the successful usage of ICTs in education. On-going teacher training and support is critical to successful utilization of ICTs in education (Trucano, 2005).

Dale (1969), an expert in audio-visual education, created a model that he termed the Cone of Experience to discuss various modalities or channels of imparting information. The diagram from his model breaks down different modes of learning and argues that more active modalities are better for long-term learning: we remember10% of what we read, 20% of what we hear, 30% of what we see, 50% of what we see and hear, 70% when we participate in a discussion or give a talk and up to 90% of what we do. This is important for this work in that when teacher trainers use visual, audio and audio-visual materials in teaching, student teachers get more

involved and their ability to retain will be stimulated especially given that these materials encourage active participation in the lesson. Learners therefore will develop more interest in the learning activity, interact with mates, and participate by asking and answering questions thereby enhancing their understanding and consequently their knowledge on the content area.

This will also enhance greatly, their mastery of these devices as they learn better by experience, thereby improving their professional development. This is in line with the view of Olayinka (2016) that instructional materials enable both the teachers and students to participate actively and effectively during lessons. Also, Yusuf & Afolabi (2010), Shaikh (2009), Jayson (2008) argue that ICTs (like the television and computer) help to improve the quality of learning and educational outcomes as they make learning more interactive, collaborative and interesting. Dale's Cone of Experience is illustrated in the figure below. The sufficient use of ICTs in the training of student teachers will thus enhance their skills in the use of these devices in lesson preparation, presentation and evaluation.

Looking at Curriculum development in the Asia-Pacific Region for example, the country reports for Malaysia, Thailand and Viet Nam describe curriculum development within these countries. In Thailand national reforms are underway across the entire school curriculum. In Viet Nam a revised curriculum is being implemented in primary and lower secondary schools from the 2002/2003 school year, and for upper secondary schools from 2004/2005. With respect to ICT, curriculum documents in Malaysia explicitly require the use of ICT; in Thailand ICT use is encouraged; while in Viet Nam the new curriculum emphasizes the need to use ICT (Downes et al. 2003).

In Cameroon, several developments have been made at the level of curriculum with the aim to integrate ICTs to enhance quality teaching and learning. ICT was introduced in nursery and primary schools and primary teacher training colleges in Cameroon in 2007 with the syllabuses published in September 2008 (Nkwenti, 2012). In 2013, the Ministry of Secondary Education came up with new syllabuses for primary teacher training colleges which included two subjects: ICT and Didactics of Educational Technologies that were meant to train teachers on computer awareness and integration of ICTs in planning and presenting lessons in other subject areas in the curriculum of the primary school (MINESEC, 2013). Nkwenti (2012), looking at the distance covered so far, holds that National Sequential Schemes of work were published in 2008 and 8 textbooks were written and validated by the National book commission to facilitate the teaching of ICT. Also, 96.23% of public schools now teach ICT to primary

school pupils though 87% of the teaching is theory; 100% of Teacher training colleges teach ICT to student teachers though 55% of the teaching is theory.

On the request of the Ministry of Basic Education, Higher Teacher Training College (ENS) now train ICT teachers and the first batch was posted to Government Teacher Training Colleges (G.T.T.C.) in 2009 to boost the training of primary school teachers on ICT integration. The subject ICT was tested in the 2010 and 2011 sessions of examinations organized by MINEDUB with all candidates for CEP, FSLC and CAPIEMP taking the optional paper with a performance of 61% in 2010 and 68% in 2011. All holders of CAPIEMP from G.T.T. Cs since 2009 have ICT knowledge though with limited practical skills. He however regrets that only 3% of public schools have access to limited ICTs thus teaching remains purely theoretical. Since 2008 when the official syllabus went operational, only 1.2% of in-service teachers have been trained on the practical use of ICT though 67.2% have theoretical skills through pedagogic day trainings (Nkwenti, 2012).

Based on the above analysis, it is obvious that the putting in place and effectively implementing a concise ICT policy is an issue even though the respective governments, supported by some international organizations are making efforts towards providing a framework and resources to enhance the integration of ICTs in pedagogy in their respective countries. Their approaches however differ based on certain strategic technical and financial challenges. From the analysis, it can be deduced that a good ICT policy needs to identify who provides ICT infrastructure, which ICT infrastructure is required, what form of training should be given to teachers on the integration of ICTs in the teaching-learning process, how and when supervision and evaluation of the implementation of such a policy should be done and by whom and how updates shall be made. Such a national policy should also stipulate a holistic approach for providing ICT resources and training that will cover schools and teachers in both rural and urban areas and cut across primary, teacher education, secondary and higher education sectors. It also requires fundamental changes in curriculum change or development that will influence the teaching methods and approaches used by teachers.

Mbangwana (2008) reiterates that Policy implications in Cameroon include the need to develop expertise within the nation, provide training opportunities, and encourage initiative and innovation on the part of teachers. He therefore calls for re-conceptualizing and restructuring the educational enterprise, so as to confront the technological challenges of this millennium. With rapid changes within society and radical transformations in the way people acquire knowledge, new teaching paradigms are required, ones that tune educational systems

to modern times and ensure quality training for large numbers of persons to acquire 21st century skills.

Different Ways Teacher Trainers use ICTs to Train Student Teachers

How teachers use ICTs is dependent on their general teaching styles. Types of usage of ICTs correlate with teacher pedagogical philosophies (Trucano, 2005). Teacher trainers use diverse approaches to integrate ICTs during teaching, while training student teachers. Tinio (2003) presents three main approaches for integrating computer, internet and other accessories in the teaching-learning process: Learning about computers and the internet, in which technological literacy is the end goal; Learning with computers and the internet, in which the technology facilitates learning across the curriculum; Learning through computers and the internet, integrating technological skills development with curriculum applications.

In teacher training colleges in Cameroon today, ICT and Didactics of Educational Technologies have been introduced as subjects in the new syllabuses for the training of student teachers (MINESEC, 2013). A look at the content of these subjects, it shows that both subjects though independent, are inter-linked in preparing student teachers on ICT awareness and on integration. While the content on ICT is mostly centred on building the student teacher's computer awareness skills, it has a section on lesson planning, that emphasize the training of student teachers on how to integrate ICTs in drawing up and executing lesson plans. Didactics of Educational Technologies on its part is more focused on grooming student teachers on how to select, integrate and use these ICTs to draw lesson plans and teach content in other subject areas (MINESEC, 2013).

These two subjects cover Tinio's notion of learning about ICTs and Learning through ICTs. The fundamental problem realised by experience is that most of the teacher trainers themselves lack the knowledge and skill in using these ICT tools in teaching as most of them were never effectively trained on this. Some teacher trainers handling the other subject areas and who are knowledgeable in ICTs use some to facilitate the presentation of their lessons to student teachers like computers, projectors, and internet. This covers the notion of teaching with ICTs. These three main approaches of use expose student teachers and enhance their skills in the integration of ICTs in the teaching-learning process.

In learning about ICTs, the technological literacy of student teachers is enhanced as they are exposed to fundamentals such as basic terms, concepts, and operations. They also learn the use of the keyboard and mouse, use of productivity tools like Word Processors, spread

sheets, database and graphic programs, use of collaboration tools like search engines and Email, developing an awareness of the social impact of technological change and so on (Tinio, 2003).

Learning with ICTs focuses on how the technology can be used as the means of learning across the curriculum. This involves the presentation, demonstration and manipulation of data using productivity tools; use of curriculum-specific applications like educational games, drill and practice, simulation, tutorials, virtual laboratories, visualizations and graphical representations of abstract concepts. It also involves the use of information and resources on CD-ROM or online like encyclopaedia, interactive maps, and electronic journals. Tinio (2003) however adds that technological literacy is required for learning with technologies to be possible, implying a two-step process in which students learn about the technologies before they can actually use them to learn.

Learning through ICTs combines learning about them and learning with them. This involves learning the technological skill as the learner engages in a curriculum activity. For example, when student teachers are given an assignment to gather and summarize content to plan a particular lesson, as the search on the internet and use Word Processors and other software, they are consequently learning through these ICTs. The following lessons were learned by the researchers about the role of ICT in continuous training:

Bottino and Chiappini et al. (2004) concludes that the combination of theoretical aspects with practical experience and application to real problems helps users to acquire self-confidence, understand problems and tackle tasks successfully. Also, users learned that practicing with and without the guide of someone else are a valuable help for learning. They also learned that autonomous learning capabilities are the basis for personal growth while working in a group is difficult but presents advantages for learning. Lifelong learning requires autonomous learning activity. Different approaches to learning must be adopted. Motivation and the capability of cooperating with colleagues are central. The project showed that the web and multimedia technology effectively give the possibility of realizing continuous training experiences. It suggests that practical conditions like management, technology, maintenance must be guaranteed to make the use of ICT for training effective.

2.2.2. ICT program goals and competences

The goals of ICT program in Cameroon's Teacher Training Colleges (TTCs) are derive from is derived from law no. 98/004 of 14th 1998 laying down guidelines for education in

Cameroon. The aim of education is stated in article 4, it states that "the *purpose of education shall be to train children for their intellectual, physical, civic and moral development and their smooth integration into the society bearing in mind prevailing economic, socio-cultural, political factors*" Akemche (2014). To these developments are difficult to me made without technology in general and ICT specifically. This aim is reinforced by article 5/1 which state the goal of education being to train citizens to be firmly rooted in their culture but open to the world… (Akemche, 2014). In this age of globalisation learners or citizens cannot be open to the world without information and communication technology. It has to start with the teachers. That is why ICT was introduced as a subject in TTCs in 2007 and reformed in 2013.

The 2013 program reform for TTCs in Cameroon Decision N°. 495/B/ MINESEC/ CAB /30TH AUGUST 2013) by the ministry of secondary education, highlighted as some of the target of the new syllabus educational technology. Its Terminal Competence for ICT states that at the end of the course, the student-teacher should be able to solve problem situations using resources from Information and Communication Technologies in order to teach Educational Technologies in primary and nursery schools. While the following competences were stated:

- C11: Plan and facilitate learning/teaching activities;
- C12: Organise class work according to various situations adapted to learners;
- C22: Work in a team, collaborate with the hierarchy and the education community;
- C22: Work in a team, collaborate with the hierarchy and the education community;
- C31: Work in discipline, respect, deontology and professional ethics;
- C31: Work in discipline, respect, deontology and professional ethics;
- C32: Participate in the conception and the realization of socio-educational activities;
- C33: Sensitize and accompany the education community in the domain of environmental protection;
- C41: Analyse students' results and class performance to evaluate the pedagogic practices.
- C42: Amend educational practices taking into account changes and innovations.

These competences have the following basic competences in its planning: Solve problem situations basing on the management of an operating system; Solve problem situations basing on the knowledge of a computer/digital work environment; Solve problem situations related to the production of digital documents; Using Internet to solve problem situations related to communication, legal, ethics and social issues; and Present lessons while integrating ICT following CBA from an elaborated form. The goals, competences and basic competences

in TTCs are planned to achieve professional development in teacher training. Extract 2 below shows an example of Educational Technology subject in teacher training college

Question (4marks)

*For a common lesson presentation for **Level Three** in your school, the head teacher asks you the Class **Five teacher** and another colleague to prepare and present a lesson ''**How to Use the Internet**''. Based on your knowledge in **Educational Technologies**:*

- *describe any teaching style that you can use to effectively teach the lesson. **(2marks)***
- *identify two techniques that can be used in animating the educational technologies class. **(5x2=1mk)**.*
- *Propose one consolidation exercise for the lesson.*

Extract 2 showing a portion of Didactics of Educational Technology certificate exams setting.

Table 10: Showing individual lesson plan of ICT

INDIVIDUAL LESON PLAN ON ICT FOR MONDAY 1st NOVEMBER 2021

TIME: NOVEMBER 2021 — **CLASS:** 1

INTEGRATED LEARNING THEME: Communication (from the syllabus) — **N^{O} ON ROLL:** 20

LESSON TITLE: Traditional and Modern Tools for communication — **AVERAGE AGE:** 6 YEARS

ENVISAGE PROJECT: None — **TIME:** 9:00am - 9:30am

LEARNING OUT COME (OBJECTIVE): After presenting, Observing, Questioning and Discussing on the traditional and Modern Communication tools using a chart bearing images of a Radio, a Gong, a Phone, a Computer, a Rattle, a Drum, a Television; kids will be able to sort traditional and Modern communication tools from a list correctly within 30 minutes. — **DURATION:** 30 Minutes

PREVIOUS KNOWLEDGE: Kids can identify and name Traditional and Modern ICT tools

CORE SKILL (COMPETENCE TO BE DEVELOPED): Sort ICT tools

INSTRUCTIONAL MATERIAL: A chart bearing images of Traditional and Modern ICT tools

REFERENCES: Primary School Curriculum for levels 1&2, My First Click on ICT by Tatuh N. Atem et al page 5.

STAGES/ DURATION	CONTENT (SUBJECT MATTER)	TEACHERS ACTIVITY	LEARNERS ACTIVITY	TECAHING/ LEARNING AID
INTRODUCTION (2 Mins)	**Recall previous knowledge**	**(Pose questions)** – Name some traditional ICT tools use for communication? – Name some Modern ICT tools use for communication?	Answer on appointment –A Gong, Flute, Rattle, a Drum, Whistle, a Bell. – A Computer, a Radio, a mobile phone, a television , a camera	

<table>
<tr>
<td>PRESENTATION
(20 MINS)</td>
<td><u>Sorting ICT tools under Traditional and modern ICT tools</u>
 
</td>
<td>(Pose questions)
Observe these images keenly and give their names.
– What do they represent?
– Abe come and pick out the images on the chart representing traditional ICT tools?
– Joy come and Pick out the images on the chart representing Modern ICT tools</td>
<td>Learners observed keenly and quietly.
– Answer oral questions on appointment
– Pupils move forward to the board and pick out the images</td>
<td>– A chart bearing the various IICT tools.
– A pointer
– A chalk and a black board</td>
</tr>
<tr>
<td>CONCLUSION
(EVALAUTION)

(8 MINS)</td>
<td><u>In your exercise books, select names of ICT tools from Column B and write them under the Headings, Traditional ICT tools and Modern ICT tools in Column A</u>
<table>
<tr><th>COLUMN A</th><th>COLUMN B</th></tr>
<tr><td><u>TRADITIONAL ICT TOOLS</u></td><td></td></tr>
<tr><td>-
-
-
-</td><td rowspan="2">– A GONG
– A MOBILE PHONE
– A TELEVISION
– A BELL
– A COMPUTER
– A RATTLE
– A RADIO
– A DRUM</td></tr>
<tr><td><u>MODERN ICT TOOLS</u></td></tr>
<tr><td>-
-
-
-</td><td></td></tr>
</table></td>
<td>Teacher move round to mark, inspect and guide the weak pupils.</td>
<td>Write in their exercise books.</td>
<td></td>
</tr>
</table>

Students are expected in extract 2 above to state and explain the uses of the internet. They have to teach and learn about it. As seen in the table above, didactics of Educational Technologies (DET) and Information and Communication Technologies (ICTs) form part of the Grade one examination. As seen in the table and extract above, In Information and Communication Technologies (ICTs), students have to understand the computer, types of computers, services that the internet offer etc while in DETs, students are taught how to teach the ICTs to primary school pupils. The item 'internet' in the national teachers training college exams (CAPIEMP) setting 2018 Question 3 insists that students should know not only how to use the internet but also how student teachers can teach primary school pupils how to use the internet. However, many colleges do not have ICT laboratories to do the practicals.

2.2.3. Assessment methods

According to Decision N°. 495/B/ MINESEC/ CAB /30TH AUGUST 2013 (MINESEC, 2013) evaluation or assessment in Teacher Training Colleges should take into consideration diagnostic, formative, criterion-referenced and integrating assessments using the problem-situations technique. According to Ysseldyke, Slavia and Bolt (2007) assessment involve processes provide information or data collected with orientations towards evaluations. Assessment processes are catalyst in the instructional processes which are the implementation phases of ICT program planning in teacher training colleges in Cameroon.

2.2.3.1. Diagnostic assessment

According to Hanna and Dettmer (2004) diagnostic assessment refer an assessment exercise carried out by a teacher to facilitate the identification of students' prior or the current level of knowledge with respect to a particular subject, specific set of abilities, capacities which is used for the clarification of misconception before actually starting with the teaching and learning processes. Diagnostic assessments in the Cameroonian teacher training colleges especially in ICT and educational technology programs facilitate obtaining of data on students' individual or collective weaknesses and strengths. This data guides the teacher in planning ICT and educational technology instructional content and select instructional methods and techniques that would facilitate the acquisition of subsequent knowledge, skills and will reinforce competences.

3.2.3.2. Formative assessment

Formative evaluation in teacher training colleges in Cameroon is carried out on daily and weekly bases. However, there is an officially programed monthly formative assessment for the purposes of verifying the level of attainment in teaching and learning objectives. Therefore, Afitska (2014) views formative assessment as an assessment that is oriented towards facilitating the processes of verification of students' acquisition in a particular domain and determine their subsequent learning outcome. To the teacher's formative assessment enable them to re-strategize their teaching methods, techniques and the use of resources that will facilitate the acquisition of knowledge, the development of abilities and skills, and the reinforcement of aptitudes and competencies to ensure effective students' professional development.

2.2.3.3. Criterion-referenced assessment

According to Learning and Teaching Committee (2005) criterion-reference assessment refer to a student assessment whereby the extent of their individual achievement with respect to intended learning objective of a specific subject or a particular program like ICT and educational technology. Furthermore, it holds that the assessment of students' is based on a criteria and standards of performance predetermine, clearly defined, communicated to student teachers explicitly ahead of the teaching and learning sessions. Also, grades are assigned absolutely according the performance standards demonstrated by the student based on the criteria, which is independent of other students' performance in the same cohort. Learning and Teaching Committee (2005) reiterate that grades for assessment has no pre-set distributions, that is why it is possible for all the student teachers in a class to fail or have distinction in an assessment exercise. The criterion-reference assessment is used in assessing student in ICT course and program in teacher training colleges for equity purposes.

2.2.3.4. Integrating assessments

Integrating assessment in the Cameroonian teacher training colleges is based on exploiting assessments for quality teaching and learning processes and outcomes. Therefore, Kesianye (2015) affirm that integrating assessment might take place at three levels: the first is about directly relating what is taught to what is assessed and in return all elements of the curriculum should be assessed using different assessment techniques and strategies. By assessment being directly related to teaching, it will be seen as an integral part of teaching; secondly assessment should be carried out to investigate the extent of effectiveness of the curriculum and the teaching process. In other words, assessment should seek to verify adherence of the teaching and learning processes to the specified curriculum; and thirdly, integrating assessment and teaching has to do intertwining teaching and assessment for formative exploitation. This level makes use of learning process, individual progress and resources require for progress. According to Grouws and Meier (1992) in Kesianye (2015) there exist research evidences that continues assessment of students' knowledge, thinking and problem solving skills result in more effective and efficient practice. This is why TTCs exploit integrating assessment.

2.2.4. External instruments

External instruments or international texts has to do with those conventions, treaties and chatters established by international bodies like the United Nations Organisation UNO),

African Union (AU), United Nations Educational Scientific and Cultural Organisation (UNESCO) and a country is a sign and ratifies it. Cameroon has ratified a good number of international instruments related to education of which planning and ICT program are key component (Yangsi, 2014). Furthermore, he cites the universal declaration of Human Rights and Citizen. In its article 24, it is clearly stated that the article talks about education and three elements are relative to this work. The first is that '*everyone has the right to education'*, the second is that '*technical and professional education shall be made generally available* …', and the third is that '*education shall be directed to the full development of human personality and strengthen the respect of human rights and fundamental freedoms'*. It is difficult to achieve these three today without ICT, reasons for ICT programs in schools today for professional development.

2.2.4.1. UNESCO Planning Guide for ICT Integration in Teacher Education in the Cameroon

The three key principles put forth by Society for Information Technology and Teacher Education (SITE) and cited in the UNESCO Planning Guide for ICT in Teacher Education (Resta, 2002) are particularly pertinent for countries in the Asia-Pacific region looking for the most effective ways of integrating ICT in teacher education but which is also valuable for analysing ICT policy in teacher education in Cameroon. The first principle is that technology should be infused into the entire teacher education program. This implies ICT should not be restricted to a single course but needs to permeate all courses in the program. The second principle advanced by SITE is that technology should be introduced in context. According to this principle, particular ICT applications like word processing, databases, spread sheets and telecommunications should not be taught as separate topics but rather encountered as the need arises in all courses of the teacher education program.

The third principle is that students should experience innovative technology-supported learning environments in their teacher education program. This principle requires that students should see their lecturers engaging in technology to present their subjects, for example, utilizing PowerPoint or simulations in lectures and demonstrations. Students should also have the opportunity to use such applications in practical classes, seminars and assignments. The application of these three principles will go a long way towards effectively integrating ICT in teacher education (Resta, 2002).

Looking at the Cameroonian context in the light of these principles, the first principle requires that technology be infused into the entire teacher education program and not restricted to a single course but needs to permeate all courses in the program. Primary teacher education in Cameroon falls short of this requirement given that the new syllabuses for teacher training colleges published by MINESEC (2013) handles training on the integration of ICTs in pedagogy only within two subjects which are ICT and Didactics of Educational Technologies. Practical exercises within these subjects are rare based on the lack of ICT infrastructure in most teacher training colleges. In similar perspective, the second principle advanced by SITE which requires that technology be introduced in context is also problematic in our primary teacher training colleges given that Word processing, databases, spread sheets and telecommunications are only encountered in ICT and Didactics of Educational Technologies and encountered as separate topics within these two subjects in the teacher training college.

The third principle which requires students to experience innovative technology-supported learning environments in their teacher education program is also problematic given that very few teacher trainers will use technology like PowerPoint or Simulation to present their lessons as most of the teachers are not computer literate themselves. Even those who have the technological knowledge are prevented by infrastructural problems like electrical power problems and the absence of projectors and computers in school. The new syllabuses prescribe three weeks for each teaching practice session broken up into observation, autonomous and guided practice running for each of the weeks (MINESEC, 2013). Added to ICT infrastructural challenges, limited lesson duration and teaching practice duration, the student teachers find it difficult to apply knowledge of integrating ICTs during training.

It is therefore worthwhile to note that ICT policy in Cameroon as far as primary teacher education is concerned has not been drafted to observe these three principles for effective training of teachers on the integration of ICTs in the teaching-learning process. Bottino (2003) highlight some general indications that can be outlined in ICT integration policy in teacher education such as: Promoting co-operation among teachers, researchers in educational technology and in discipline subjects, administrators, trainers, parents, and so on. This could be done by increasing investments in research and development and in the creation of new learning environments for working together; Promoting the collection, documentation, and diffusion of good practice examples; Promoting curricular change, shifting the focus from knowledge as a set of content to knowledge as an integration of processes and skills; and

rethinking teachers' training as a life-long learning perspective with pre and in-service training programs.

2.3. THE ICT PROGRAM PLANNING PROCESS

Educational planning process is briefly summarised into three periods which are before, during, and after. Planning process even with ICT program has to do with the procedure of developing or constructing a logical structure which is generic in nature and varies from one country to the other (WikiEducator, 2021). This variation can be explained by the degree or extent to which education plan is integrated into economic plan, how weak or strong statistical services are, the existing features of the general school system (public and private). In a country for planning process to be effective and efficient, there has to be an identification and analysis of the national goals, construct a draft educational plan and choose the best alternative, approve and experiment, after the experimentation face modify, implement and monitor, then evaluation and feedback. However, in the context of this work focus shall be laid on diagnosis, implementation, monitoring, and evaluation of ICT programs in teacher's training colleges to impact professional development.

2.3.1. Diagnosis for identification and analysis of objectives

Ahmad, Ahmed, and Al-Lawati (2010) states that during this digital technology age information transmission, encoding, storage and retrieval has become more efficient with little cost. In the educational sector or field, there has been a great influence of digital technology especially through Information and Communication Technology (ICT). This influence has therefore brought a series of enriching materials into schools (libraries) and classrooms to facilitate the teaching and learning processes for teachers and students. Also, Nouri and Shahid (2005) as cited in Ahmad, Ahmed, and Al-Lawati (2010) state that these technological materials have provided students with opportunities to exploit maximum senses for information acquisition and has equally successful destroyed monotony while providing a variety of situations for the teaching and learning processes. In order for these technological materials to be appropriately used in fostering ICT program, there has to be an effective diagnosis during the program planning face of the planning process.

Furthermore, from the perspective of ICT program planning diagnosis, Alexopoulou, Batsou, and Drigas (2019) hold one of the major technological move or leap that has taken place in recent years in the invention and the ever increasing usage of Information and Communication Technology (ICT). They hold that there are a series of reconsiderations to be

made during the planning stage of ICT programs. This is explained by the fact that the capabilities of existing computers and ICT devices are questionable when it concerns meeting the needs and expectations of modern education. This view is supported by Sansanwal (2009) in Ahmad, Ahmed, and Al-Lawati (2010) who states that ICT is today used in all the departments and levels of education, because it facilitate teaching, diagnostic testing, execution of remedial classes, course work and student evaluation, psychological testing, materials for the development of virtual laboratories, e-teaching and e-learning (electronic education), development of critical reasoning and thinking, and above all modern instructional development. From this perspective, Ahmad, Ahmed, and Al-Lawati (2010) concludes that ICT tools facilitate the improvement of quality computer based diagnostic testing and teaching. Therefore, its planning should also plan diagnosis of the program.

Also, according to Alexopoulou, Batsou, and Drigas (2019) researches has been able to assess and acknowledge new technologies such as ICTs as instruments for liberating and creating enormous opportunities to persons and learners with disabilities. This is because these new technologies go beyond simple information transmission and management to being supportive; improving both the learning ability and academic performance of students, while facilitating the functionality of those with special needs especially those with special educational needs. Therefore, during the planning stage of ICT program development, it is important for diagnostic planning to be put in place and diagnosis done as to ensure that the program meet national and international norms, while meeting the specific needs of the learners. Furthermore, Ahmad, Ahmed, and Al-Lawati (2010) attest that long-term learning that are effective and efficient and depend on the planning of the interconnections within topics and application. Therefore, diagnostic planning as well as teaching processes are factors for the attainment of efficient long-term learning in all disciplines especially in ICT. That is why Rusbult (2009) as cited by Ahmed et al. (2010) states that diagnosis help to detect, understand, and give opportunity for correction of misconceptions. That is why diagnosis is important in ICT program planning processes.

Furthermore, Ahmad, Ahmed, and Al-Lawati (2010) state that learners are frequently assessed at different stages of the teaching and learning processes for different purposes. This is the reason while diagnosis for classroom assessment in ICT program should be planned at the planning stage of the program to ensure students professional development in teacher training colleges. Furthermore, Amed et al. (2010) affirm that screening at the diagnostic stage of planning should take into consideration progress monitoring and outcome variables. This

will provide diagnostic information that is valid and reliable for about the instructional needs of the students in ICT. On the other hand, Alexopoulou et al. (2019) hold that ICT program planning diagnosis has to take into consideration learners with attention and hyperactivity disorders (ADHD). Therefore, in planning ICT diagnostic, assessment, and intervention tools, there should be a direct connection and interaction plan between attention and memory capacity. This because with the help of ICT (technology) tools attention and hyperactivity disorders can be evaluated, the memory improved, and attention is arrived at. By planning process taking into consideration diagnosis, students' professional development will greatly be improved.

In order for ICT program planning to improve students' professional development, Johnston and Scott (1991), Kraus and Close (2008) and Sansanwal (2009) as cited in Ahmad et al. (2010) states that it is important to plan and complete diagnostic assessment before permitting teachers to engage in instructional plan so as to enhance educators' information capacity on students' previous knowledge before beginning instruction. Also, Alexopoulou, Batsou, and Drigas (2019) hold that ICT or education technology should be planned in the planning process of ICT program in such a way that it improves execution functions and improve technology its self. Therefore, diagnostic based planning in the teaching and learning process has to do with gathering feedback information on learners' difficulties in ICT through the assessment process. This will go a long way in making ICT program planning process a catalyst for students' professional development in teacher training colleges.

2.3.2. Implementation of ICT program

The implementation of ICT programs in teacher training colleges has to with planning implementation activities that concretely are applied or carried out in the classrooms and multimedia or computer laboratories.

Implementation of Teaching Learning Activities

Didactics of Educational Technologies and Information and Communication technology (ICT) were two important subjects included. As a terminal competence, at the end of the course on Didactics of Educational Technologies, the student-teacher should be able to prepare and conduct teaching-learning activities by integrating pedagogic innovations to solve problem-situations. The terminal competence for ICT states that student teachers at the end of the course should be able to solve problem situations using resources from information and communication technologies in order to teach educational technologies in primary and nursery

schools. The goal of these two subjects was to groom student teachers develop competences in computer awareness, such that they can effectively teach ICT and integrate ICT tools to teach all other subjects on the primary school curriculum. These new syllabuses were meant to prepare student teachers with the help of pertinent teaching-learning approach, to integrate in the world and confront a job market that is becoming more and more demanding. (MINESEC, 2013).

Table 11: Organization of Teaching Practice within the Academic Year

Levels	Number of sessions	Nature of Teaching Practice	Duration (in Weeks)		Structures
Three-year course: 1st Year (in hours)	2	Observation	6	3	Nursery school
				3	Primary school
Three-year course: 2nd year	2	Guided Practice	6	3	Nursery school
				3	Primary school
Three-year course: 3rd year	2	Autonomous Practice	6	3	Nursery school
				3	Primary school
Two- year course: 1st year	2	Observation	6	2	Nursery school and primary school
		Guided Practice		4	Primary school
Two-year course: 2nd year	2	Guided Practice	6	2	Nursery school
		Autonomous Practice		4	Primary school or Nursery school
One-year course	2	Observation	6	1	Primary school
				1	Nursery school
		Guided Practice		1	Primary or Nursery school
		Autonomous Practice		3	Primary or Nursery school

Source: MINESEC (2013)

These syllabuses were based on the Competency-Based Approach using life skills. Didactics of Educational Technologies and Information and Communication Technology on the new syllabus have a weekly time allocation of one hour each and annual time allocation of twenty-two hours, while ICT has a weekly time allocation of two hours and annual time allocation of forty-four hours as seen on table 5. Based on the role these two subjects play in the training of student teachers for the effective integration of ICTs to education, and given that the content of the other subjects do not emphasize this integration, one would have expected more time

and coefficients to be allocated to these two subjects like is the case with General Pedagogy and Educational Psychology.

2.3.3 Monitoring of ICT program planning process

According to UNESCO (2016) monitoring in planning is similar to evaluation but they are very much distinct. However, they play a common role of verifying the impact of a policy, progress of program activities, with respect to stated goals and objectives, as well as targets. Therefore, monitoring involves assessing relevance outcome of an activity or activities, impact of a program like the ICT program, the effectiveness of a policy like the ICT program policy, and in general the efficiency and sustainability of all the mentioned components. In this direction, OECDDAC (2002) in UNESCO (2016) refer to monitoring as a systematic process that is on-going, intended to collect information so as to assess the progress made toward achieving set goals and objectives, outcomes and impacts. Furthermore, Rodríguez et al. (2010) hold that planning of monitoring in ICT program has already shown its effectiveness in the intervention and implementation processes. Therefore, teacher training is directly impacted by ICT pedagogical based model in teaching even other subjects, thereby enhancing students' professional development.

Monitoring of educational systems is a global, regional and national issue as it calls for discussions and debate at these levels such as the Daker Education Forum of the year 2000 and a series of post Daker educational forums and conferences that have taken place at the regional and national levels. All these is stimulated by the mission to attain global goals in education which has come along with concepts such as; 'access to equitable and quality education for all', 'expanded vision of basic education', and 'lifelong learning' (UNESCO, 2016). These missions or goals affect the planning and designing of ICT program monitoring in many countries globally. This is because the paradigms of monitoring planning and implementation have today shifted toward performance based and is more focused on result-oriented outcomes. This has resulted in quality ICT program implementation and students' professional development. Therefore, result outcomes orientation in monitoring takes into consideration contextual development, trends of current educational reforms aiming at achieving quality in education, and even nature of the program. Therefore, ICT programs have greatly influence approaches in planning monitoring activities and practices in the educational sector, hence greatly influencing planning processes and students' professional development. Therefore, Richard (1988) as cited in UNESCO (2016) proposes the following typology (Typology of Educational Monitoring Systems) for monitoring quality of educational programs (ICT

program) from inputs, processes to outputs: Compliance monitoring (focusing on inputs): This has to do with a type of monitoring which is bureaucratic in structure to ensure the respect of predetermined standards and norms by educational institutions (programs) following established roles and regulations. It examined the nature and quality of classrooms, teachers' inputs, textbooks, teaching equipment (tools) and materials. It is very important for the planning process of ICT program to take into consideration compliance monitoring during planning and implementation.

Diagnostic monitoring (focusing on processes): Diagnostic monitoring focuses on instructional processes with respect to activities in the classroom and the students effectively learning what was designed for them to learn. The teaching and learning process activities are considered in this case is as important input variables of the educational system. This monitoring type is meant to give insights information and explain the quality of programs and education in general provided by educational institutions. ICT program cannot be planned without taking into consideration the teaching and the learning process, because that is the final purpose for planning.

Performance Monitoring (focusing on output): This type of monitoring emphasis academic achievement (professional development) of students. This is done by administering tests and examining the results to verify if the investments made on a program or education has yielded the desired benefits. The usefulness of a program such as the ICT can only be said to be useful when its output and impact on enhancing students' academic performance has been determined. Therefore, it will be said to either be in students' professional development oriented or not.

When a country runs a single educational system, it is possible for all these types of monitoring to be exploited with different types of instruments which may co-exist, while being used for different purposes. However, the planning process of a program such as ICT in teacher training colleges needs to consider and make used of compliance, diagnostic, and performance monitoring so as to improve on student teachers' professional development.

2.3.4. Evaluation of ICT program planning process

Evaluation in program planning process according to UNESCO (2016) is similar to monitoring. However, actually they are very different in their usage and orientation. That notwithstanding, they play a common role of verifying the impact of a policy, progress of program planning activities, guided by stated goals, objectives, and originally set targets. Therefore, according to OECDDAC (2002) in UNESCO (2016) evaluation refer to a systematic and objective process

of assessing a project that is in progress or has been completed, a program, its policy, its design, its implementation and results in order to determine objectively the relevance, attainment of goals and objectives, development effectiveness and efficiency, impact and sustainability. Therefore, evaluation plays a catalyst role in ensuring that ICT program planning processes are specific, measurable, attainable, realistic, and time bound. With this quality taken into consideration in the planning processes, then students' professional development is assured.

According to UNESCO (2016) evaluation of educational programs and systems is a global, regional and national issue as it calls for discussions and debate at these levels such as the Daker Education forum of the year 2000 and a series of post Daker educational forums and conferences that have taken place at the regional and national levels. All these is stimulated by the mission to attain global goals in education which has come along with concepts such as; 'access to equitable and quality education for all', 'expanded vision of basic education', and 'lifelong learning' (UNESCO, 2016). One of the main purposes of educational program (ICT program) evaluation is to verify, ensure, and maintain equity and quality in education. These goals affect the planning and designing of ICT program evaluation in many countries globally. This can be explained by the change of paradigms of evaluation planning and implementation, which has shifted toward performance-based and result oriented outcomes.

UNESCO (2016) proposes the following typology (Typology of Educational Evaluation Systems) for evaluating quality of educational programs (ICT program) from the perspectives of program relevance, effectiveness, efficiency, impact and sustainability:

- **Policy or program relevance**: program policy or relevance in evaluation has to do with a diagnostic type of evaluation to establish the real needs of a program contrary to perceived needs which more often attract funding. Therefore, ICT program in teacher training colleges have to be evaluated to determine policy or program relevance for amelioration purposes resulting in professional development.
- **Program Effectiveness**: this type of evaluation seeks to provide information on the exact level of program relevance and quality to the respective users at the right time. An effective educational program such as the ICT program in teacher training colleges should stimulate and enhance increasing learning opportunities taking into consideration equity and sustainability in the learning opportunities.
- **Program efficiency**: this evaluation type is meant to determine how right things are being done. It determines how effective a program has been able to function with limited

resources. ICT program planning process need to consider the limited resources available in executing the program especially in a country like Cameroon. This will help teachers exploit the limited resources in ICT program to bring about quality professional development.

- **Impact and sustainability**: impact and sustainability in educational context has to do with evaluating to determine the overall effect of policy (ICT program policy) and programs (ICT) on the targeted community (in this case teacher training colleges) as well as on the socio-economic development of that particular community or country. The aim of such evaluations is to help address programs such as the ICT program from the perspectives of policy related questions and program sustainability elements and issues. In planning for an ICT program in teacher training colleges the issues of its impact on the students, and sustainability measures has to be taken into consideration to ensure continuity.

Therefore, for ICT program planning process to be complete and productive, evaluation from the perspective of policy or program relevance, effectiveness, efficiency, impact and sustainability has been carefully planned. If carefully planned and executed, information from the exercise will be used to improve on the ICT program in teacher training colleges and to plan its quality continuity resulting in students' professional development.

2.3.5 The CIPP (Context, Input, Process, Product) Evaluation model in process planning

The CIPP program evaluation model of Daniel Stufflebeam (1983) is a model that can be used to evaluate all the components of educational policy planning. The CIPP model which represents Context, Input, Process and Product is an impact assessment model developed by Daniel Stufflebeam in an attempt to make evaluation directly relevant to the needs of decision-makers during the phases and activities of a program. The CIPP approach is based on the view that the most important purpose of evaluation is not to prove but to improve. It sees evaluation as a tool by which to help make programs work better for the people they are intended to serve) Context refers to the need and opportunities that defines the goals and objectives on the basis of which the outcomes are attained.

Furthermore, input refers to the resources, infrastructure, curriculum and content needed to implement the teaching learning processes. This level raises evaluation questions about the resources that will be used to develop and conduct the innovation/program. What people, funds, space, and equipment will be or are available for the project? Will these be

sufficient to produce the desired results? Process includes the teaching learning processes, evaluation and activities; it includes all the processes that are necessary for the implementation of different activities and their formative evaluation. Product evaluation involves skills, values, attitudes and results that are needed to identify the outcomes and effectiveness of the educational program (Stufflebeam, 2004).

An exploitation of these four key aspects in planning ICT program in teacher training colleges will help in determining the strengths and weaknesses of the 2013 ICT program for teacher training is effective for enhancing the knowledge construction, skills development, ability and competency perfection of student teachers. These will be exploited in the planning processes of ICT program in ameliorating issues patterning to context, input, process, and product resulting in students' professional development in teacher training colleges.

2.4. CONTEXT OF PLANNING ICT PROGRAM

The educational planners must look for the state of the society where it wants to go and what it will require educational to get there. They also need to examine the nature of the students, their needs and aspirations, the state of knowledge itself, educational arts and technology and the innate ability of the educational system to examine itself critically and to take intelligent action to improve its own performances.

Context of ICT program planning involves the contemporary state of affairs in the environment or country. The contemporary issues in Cameroon today that affect planning of ICT programs for teacher training colleges can be examined under financial issues, socio-political issues, health issues, and available resources.

Planning is carried out in any nation at three different levels: - the strategic, tactical and operational levels. Secondary education in Cameroon is organize in such a way as to ease the flow of information from top to bottom and vice versa. Information from the hierarchy that is the central administration passes through this channel down to the implementation level. The structuring leads from the school through hierarchy to the Minister of Secondary education. This is seen on the figure 04 below

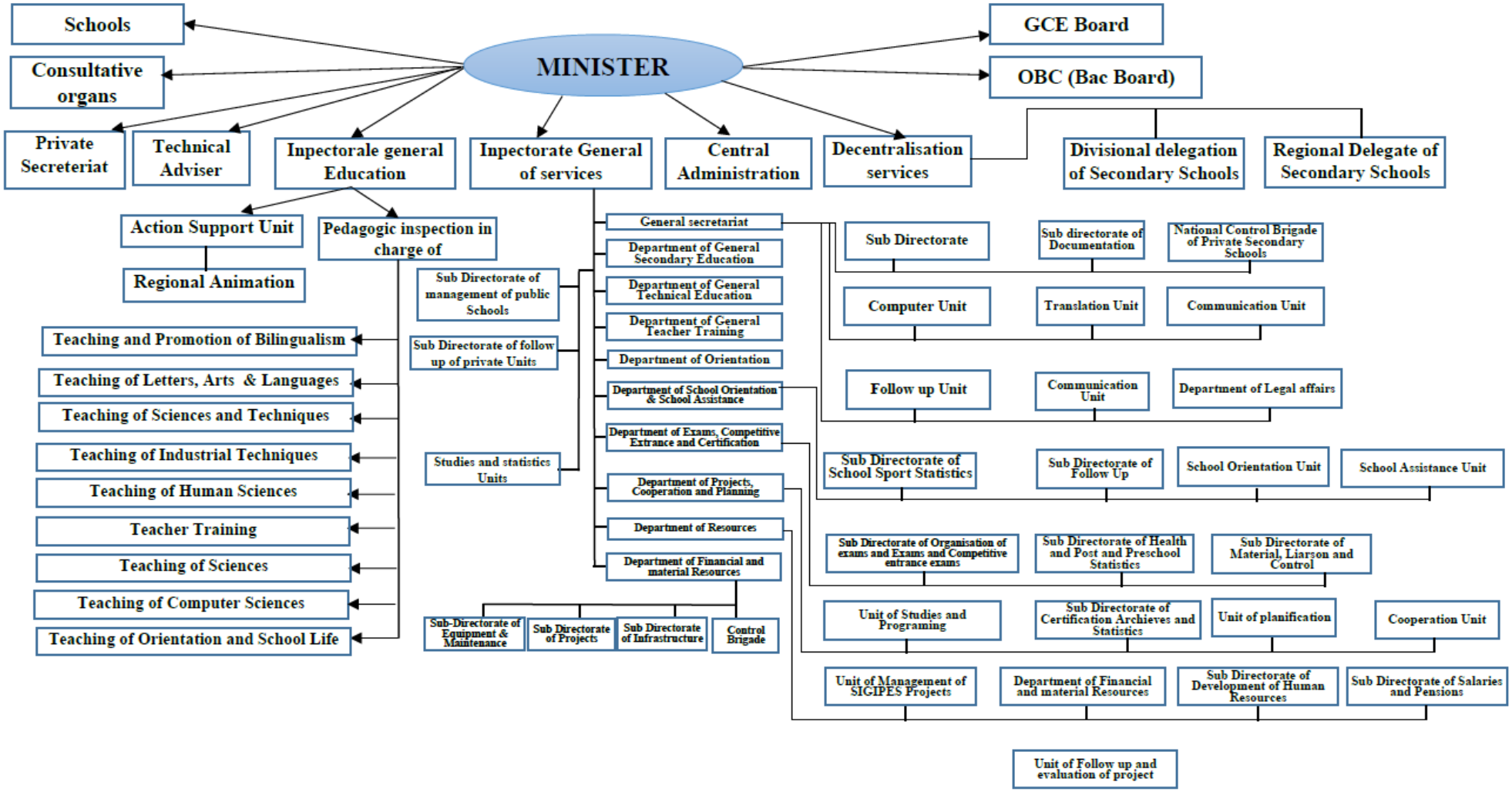


Figure 04: Organigram of MINESEC

Source: MINESEC (2018)

Strategic level

This is the level of policy and decision making and it is the level of the ministry of Secondary education in Yaounde. The ministers together with the central service in charge of education develop the policies in line with the national goals and objectives. These decisions and policies are then forwarded to the external service otherwise referred to as the tactical level for interpretation and eventual implementation.

Tactical level

This level constitutes the external services of Secondary education which are regional delegations and the divisional delegation of basic education. At these levels, the decisions, instructions, policies, text are properly interpreted and simplified for implementation. The plan of action for follow up of the day-to-day implementation of educational policies is affected here and guidelines, deadlines, methods, strategies, materials are developed. The divisional and regional delegations' function as interceders between operational and strategic levels. They are responsible for the moderation and animation of policies, check excesses and ensure their proper implementation through the inspectorate of secondary education. The organization of seminars and other educative and administrative and management clues is the responsibility of the tactical level.

Operational level

The school is the melting point of all policies both administratively and pedagogically. The school here is headed by a head teacher who on a daily basis ensure the proper implementation of Government or educational policy. The head teacher of both the nursery and primary schools are found at the operational level and carry out classroom activities. It is at this level that schemes and syllabuses of work, theory and principles are translated into concrete action and results obtained. The head teachers submit to the inspectorate regular documents and reports on the entire school life including the challenges and proposals to the hierarchy. Some key actors at this level include the teachers, kids, pupils and parents.

2.4.1. Financial issues that influence educational planning in Cameroon

Education and finances cannot be separated because they are complementary. Wagner, Bob, Tina, Kozma, Miller, & Unwin (2005) quoting Derek bok5 stated that if a person thinks that education is expensive, the person should therefore try ignorance. They therefore, hold that ignorance has been a very expensive factor in the ICT sector as well as its planning. Therefore,

every aspect or element that can be exploited to reduce or eliminate ICT program planning errors in a particular context should be considered as a valuable commodity or knowledge. Also, these aspects or elements should lead to huge investment in the ICT domain especially through planning. This has brought about a number of international agencies, national organisations, specialists, professionals, and program planners and developers to promote the implementation of ICT in education with the vision of ICT as a catalyst for social and economic change and subsequent development (Wagner, et al. 2005).

Furthermore, Wagner, et al. (2005) states that this development cannot be possible without the support of individuals, communities, and institutions at the national level. That is why the Cameroonian government put in place a ministry of economy, planning and regional development (MINEPAT) which coordinate aid and cooperation with internal or national donors (African Development Bank Group, 2015). This ministry has a department of regional integration which focuses on banks economic and technical cooperation, and the multi-partner committee that coordinates and monitors technical and financial partners. The African Development Bank Group (2015) hold that the ICT sector in Cameroon has a permanent dialogue with World Bank through consultation body which is the ministry of post and telecommunication (MINEPOSTEL) to ensure the financing of the *Cameroon Central Africa Backbone project (*CAP). The project had among many others the following objectives:

i. Reduce the high cost of ICT and telecommunications on business climate while creating jobs, and increasing production of services and goods related to ICT and telecommunication, thereby reducing poverty. Therefore, impacting ICT program planning in teacher training colleges.

ii. Optical fibre infrastructure construction, which will lead to high-quality ICT services at an affordable cost. Therefore, ICT program planners could conveniently include multimedia laboratories with internet connection at a reduced cost in the planning.

iii. The project had an infrastructural phase which was to; provide IT equipment and solar automation office to multi-purpose community tele-centres, community and education action centres, and support institutions of higher learning.

By the end of the CAP project ICT program planning policy had taken another dimension due to low-cost internet, availability of a few quality ICT facilities, and a general orientation towards the technological and digital age. While this project has greatly impacted

ICT programs in urban areas positively, its impact on ICT program in rural areas and schools is still much awaited. That is why the World Bank had engaged to continue financing the project after its first phase would have ended in 2016, and a least 2 604 248 Cameroonians benefitted from the project (African Development Bank Group, 2015).

Ndeh-Mboumien (2018) as cited in Dutta et al. (2016) stated that NRI (Networked Readiness Index) in assessing that network state of readiness of a number of selected economies in line with the Global Information Technology Report indicated that Cameroon was amongst the countries at the bottom of network readiness state with a reputation of one of the worst. However, it also indicated some marked improvement. There is still a long way for Cameroon to go in achieving or attaining a standard internet economy which is a catalyst towards the attainment good governance and socio-economic development. According to World Bank Group (2019) Cameroon needs to invest hugely in digital technology as well as ICT in order to benefit a fraction of the digital economy wealth. This wealth can highly change the financial status of the country and elevate poverty while providing sufficient financial resources for efficient and effective ICT program planning resulting in professional development.

This can only be possible through the efficiency with which ICT program planning is done taking into consideration the prevailing financial and economic situation of the country, and its projections. This assertion is supported by Ndeh-Mboumien, N. E. (2018) who states that in the AICD (World Bank Africa Infrastructure Country Diagnostic Country Report 2011) Cameroon experienced growth performance after being exposed to ICTs. Also, World Bank Group (2019) assessed Cameroon's digital economy with the aim of standardizing. Cameroon still had much to do to benefit significantly from the global digital economy that stood at US$11.5 trillion as of 2016. Cameroon can only benefit from the global digital economy if ICT program planners take into consideration the influence of finances on the ICT program planning and the influence of on the economy in this age when wealth is digital. Therefore, professional development of students today without digital knowledge, skills, abilities and competences is technically void of societal needs and expectations.

2.4.2. Socio-political issues that affect educational and ICT program planning

The socio-political state of a country greatly influences planning in all sectors of national live, and this is the case with ICT program planning in recent years in Cameroon. Before 2014 Cameroon was relatively a socio-politically stable state, conducive for education

nation-wide. McGrew (2016) hold that Cameroon is considered by most of her neighbours as bastion of stability and peace. However, uSaiD (2012) as cited in McGrew (2016) stated that while Cameroon is rich in natural resources with limited access to these resources and there is a governmental corruption endemic at all levels though the country is socio-politically stable. According to Akame, Crockett & Anoma (2021) there are a series of socio-political events that has been rocking Cameroon and impacting education over the past years. These include most specifically the Boko Haram insurgency in the northern part of the country and the Anglophone crisis on the major headlines. These events have greatly affected educational planning in general and ICT program planning in particular, and subsequently students' professional development.

The insurgency of the Boko Haram terrorist group is based on their literal name which literally mean western values and education are taboos (Akame et al., 2021). That is why their attack is based on destroying schools which affects the educational system in general and ICT program planning in particular. This terrorist group originated from Nigeria and since 2014 has executed a series of armed attacks on communities and schools, while kidnapping, looting and carrying out suicide attacks. According to Anadolu Agency (2021) as cited in Akame et al., (2021) they even recruit children and adult of school going ages and use them as child soldiers and suicide bombers. The activities of this terrorist group make education planning difficult and complicated. Therefore, the required knowledge, skills, abilities and competences that students were expected to acquire for their effective professional development through the ICT program is not acquired.

Another socio-political crisis that has directly affected education in general hence ICT program planning is the socio-political tensions in the English-speaking regions of Cameroon. This crisis started in September 2016 as a teachers and lawyers protest for a more typical Anglo-Saxon educational and judicial or justice system for these two regions (Akame et al., 2021). Contrastingly according to Agwanda, Nyadera, & Ugur Yasin Asal, (2020) the social media which is a component of ICT played a very negative role in aggravating the Anglophone crisis especially by being used by some Cameroonian English-speaking activists to call for school boycott and the destruction of educational infrastructures. Teachers training colleges were forcedly closed in some divisions and the government also responded by temporary shooting down internet which great affected education inn general and ICT program planning in these regions while over populating schools in the French-speaking regions making planning

very difficult and complicated. The full potentials of students' professional development through ICT program is difficult to judge.

However, it is important to state that with the major socio-political crisis the country has gone through and what they are still going through, the ministries of education have reinforced ICT program planning in the educational system in general and the teacher training colleges in particular by equipping computer laboratories and multimedia halls with modern equipment and internet. E-learning has become the order of the day in the educational system nationwide with much focus on troubled regions. These measures have reinforced ICT program planning for teacher training colleges in particular and the educational system as a whole. Therefore, ICT knowledge, skills, abilities and competences can be acquired reinforce the professional development of teachers.

2.4.3. Health issues that influence ICT program planning

Information and Communication Technology (ICT) in teacher training colleges cannot be planned without taking into consideration the current and prospective health issues in the country. According to Cameroon's Ministry of Public Health (2019) e-health was unanimously endorsed based on the World Health Assembly Resolution on e-health by the World Health Organization (WHO) in 2018. This resolution recognizes and acknowledges the value and role of digital technologies (ICTs) in the advancement of universal health coverage and attaining Sustainable Development Goals (SDGs) health objectives. That is why the ministry of basic and secondary education need to take into consideration when doing the ICT program planning especially for teacher training colleges those ICT knowledge, skills, abilities and competences that will in the future facilitate e-health for those who will pick up careers in health. This will reflect not only students' professional development but efficiency of the ICT program in this digital age.

Furthermore, it is important for ICT program planners in teacher training colleges to know the trend of ICT needs in the health sector of the country as well as the world. Therefore, Cameroon's Ministry of Public Health (2019) states that to implement the World Health Assembly Resolution on e-health by the World Health Organization (WHO), the ministry in July 2019 with collaboration with the university of Washington and other institutions drafted a plan for actors in the fields of information and communication technologies (ICTs) and health which resulted in a five years strategic vision for e-health development. This explains why ICT program policy and planning is supposed to take into consideration the needs of the health

sector vis-à-vis ICT, because of the role of technology in disease management today. Therefore, the Cameroonian health care system will be greatly improved.

Also, Evidence-Informed Policy Network (2012) earlier states that measuring the effects of e-health in developing countries are difficult, because its effectiveness needs some preliminary conditions to be successfully implemented. One of the main preliminary conditions is effective and efficient planning of the ICT programs in the educational sector especially in teacher training colleges. Cameroon cannot efficiently venture into e-health without technological knowledge, skills, abilities, and competences. And tit is the role of the educational sector to equip learners as future career actors with these potentials as they are groomed professionally. E-health in this digital age stands a great chance of improving inter institutional communication, facilitated the ordering, distribution and management of medications, and facilitate the monitoring of patients. These therefore improve the quality of health care, enhance practitioner performance, increasing patient satisfaction, and reducing cost while maximizing time (Evidence-Informed Policy Network, 2012). This can only be possible if ICT program planning takes into consideration health factors and students' professional development.

2.4.4. Resources involved in ICT program planning

No human endeavour in the educational sector can be effectively and efficiently planned and realised without human, financial and material resources. For the ICT program and policy to be effectively and efficiently planned for students' professional development in teacher training colleges there has to be available and qualified personals, sufficient finances, and suitable materials.

Role of human resources in planning

According to Piabuo, Piendiah, Njamnshi, & Tieguhong (2017) to meet the demand of today's planning needs, strategic objectives and focusing on value adding activities does not only lead to change from effective planning but meet the expectations of professionals. The case of ICT program planning for teacher training colleges in Cameroon is no different. Contrary to the traditional human resource management in planning that made the process slow, with the use of information and communication technology today in human resource development, management and planning the process has been faster more efficient. This assertion is supported by Shrivastava and Shaw (2004) and Stone et al. (2006) as cited in Piabuo et al. (2017) by affirming that changes in the human resource domain in general has experience

a contemporary twist which is information technology and ICTs through the increasing use of human resource technology.

Furthermore, the human resource technology has improved the performance of professionals in planning by enhancing research, consultations and increases professional capacities of actors in the planning and implementation level. The human resources in the planning of ICT programs for teacher training colleges in Cameroon include amongst many others; national inspectors, ICT specialist, regional inspectors, school administrators and classroom room teachers. ICT is used to catalyze efficiency at all the different levels of planning. This is why Piabuo et al. (2017) hold that, human resources in planning play the role of designing knowledge, skills, attitudes, and behaviours expected from the program by the state and the society as a whole.

Table 12: Number of student-Teachers Enrolled in Each School Year

School Year	**2012/2013**	**2013/2014**	**2014/2015**	**2015/2016**	**2016/2017**	**2017/2018**	**2018/2019**
G.T.T.C./ENIEG	24867	22603	17881	15359	13475	10797	11390

Source: MINESEC (2019)-Secretariat of State to the Ministry of Secondary Education in Charge of Teacher Training Statistic Archive.

Table 12 above shows thousands of student teacher graduate each year in teacher training colleges

Financial resources for ICT program planning in TTCs

According to law N^{o} 004 of 14 April 1998 giving orientation to education in Cameroon, education shall be the full responsibility of the state and will be financed from the state budget, bilateral and private donations. ICT program planning in teacher training colleges is financed by the budget of the state through the ministry of secondary education and bilateral organisations and agencies. Also, the Ministry of Economy, Planning and Regional Development (2020) states that the financial system in Cameroon remains underdeveloped during the first phase of vision 2035 implementation with an average Gross Domestic Product (GDP) of 3.18%. These mean that there is low access to financial services and uneven distribution of financial resources. This plays a negative role in the financing of quality

educational planning processes. Without quick access and even distribution of financial resources, quality planning cannot be done; hence poor implementation and students' professional development.

Therefore, it is difficult to ascertain the quality of ICT program planning for teacher training colleges because the planning structures or divisions are not financially independent. Furthermore, the Ministry of Economy, Planning and Regional Development (2020) reveals that there is low effectiveness in finances in general. However, the government has set an objective to through a number of reforms to make the country a first-rate financial centre with the capacity of financing a series of projects and programs. To this end the planning of ICT programs for teacher training colleges will be better financed for quality planning that will result effective students' professional development through the ICT program.

Material resources in ICT program planning

ICT program planning requires a number of material resources which result in products that would later enhance students' professional development. According to the Ministry of Economy, Planning and Regional Development (2020) in the field of technology and digital technology in particular Cameroon faces the challenge of integration of ICT dynamics. This problem bears its roots in educational planning of ICT program from the perspective of available and quality planning and implementation material resources. National ICT problems reflect the ICT program planning problems such as national digital ecosystem, digital infrastructure, network availability and security, production of digital content, digital parts and appliances assembly or production (Ministry of Economy, Planning and Regional Development, 2020).

Furthermore, the Ministry of Economy, Planning and Regional Development (2020) hold that some of these problems have been overcome or are being solved by ameliorating text book policy. The government of Cameroon has made text books especially ICT text books very available and affordable by increasing access through cost reduction, and in some cases free text books. The government has also developed in its ICT program planning the construction and equipment of computer laboratories and multimedia hall with good internet connection network for research and ICT practical activities. Planning of ICT program also involve planning of implementation materials and tools especially computers.

2.4.1. New Syllabuses for Teacher Training Colleges in Cameroon (2013)

Based on the need to enhance the professional development of student teachers to suit the 21st century standard of constructivist learning and promote the Head of State's vision to integrate ICTs in pedagogy, the Ministry of Basic Education (MINEDUB) ordered a diagnostic study on the organization and functioning of colleges within the framework of the Government teacher Training Colleges reform project. The study conducted by Marguerite Altet, a French Centre for Educational Research (CIEP) expert and published in 2011 highlighted numerous pedagogic short-comings that needed to be addressed for student teachers to develop professional competences. Among these were:

- The absence of a sound curriculum, given that syllabuses are presented as a list of contents with 26 disciplines;
- The one-year course duration for General Certificate of Education (GCE) Ordinary and Advanced level student-teachers is inadequate;
- The heterogeneous academic entry qualification of student-teachers leads to some short comings on the part of GCE Ordinary level student-teachers at the end of the course;
- Lack of synchronized programming of pedagogic activities (Practicum and evaluation);
- Inadequate training as concerns the different pedagogic reforms implemented in Basic Education (MINESEC, 2013).

From this crucial diagnosis, the Ministry of Secondary Education came up with new syllabuses for teacher training colleges in 2013 with a view to improve on the quality of teacher training for the Cameroon basic educational system, taking into consideration the political vision advocated by the Head of State. Achakeng (2014) put forward the following vision and mission statement: An education system that produces pupils who are capable of functioning effectively in the information age as well as contribute meaningfully to its further development. To harness the potential of ICTs as a means of enhancing the administrative and teaching/learning processes towards a generation of a workforce compatible with the demands of the information age. The Ministry of Basic education reiterated the following objectives identified in the ICTs policy documents towards the optimal utilization of ICTs in the Basic education sector.

The vision and objectives of the new courses of ICT based Teacher Training Program

The ICT syllabus requires student teachers to acquire the following basic professional competences:

i. Solve problem situations basing on the knowledge of a computer/digital work environment;
ii. Solve problem situations related to the production of text documents;
iii. Using internet to solve problem situations related to communication and legal, ethics and social issues;
iv. Present lessons while integrating ICT following the Competence Based Approach (CBA) from an elaborated form;

These competences are expected to be acquired under the following main themes or topics:

i. Functioning of an operating system;
ii. Knowledge of a computer /digital work environment;
iii. Production of text documents/professional office automation;
iv. Internet technology and network etiquette;
v. Pedagogical integration of ICT in classroom practice and evaluation (MINESEC, 2013)

The syllabus for Didactics of Educational Technologies on its part has the following expected basic professional competences:

- Solve problem situations making proper use of educational technology tools in school;
- Prepare and present lessons using educational technologies in the context of the CBA;
- Efficiently evaluate students learning using educational technologies in the CBA context;

These competences are to be obtained under the following major themes:

- Potential manual and cognitive tools;
- Integration of educational technologies in the teaching-learning process according to contexts;
- Methods, techniques, procedure, model, style and lesson notes;
- Evaluation of learning with educational technologies (MINESEC, 2013).

The new syllabus also emphasizes that evaluation in teacher training colleges shall be diagnostic, formative, criterion-referenced and integrating, using problem situations. The

didactic materials should arouse the learner's senses. The use of concrete objects, illustrations, audio-visual equipment is emphasized to permit student teachers understand concepts and ensure good classroom practice. Student teachers thus must be able to produce didactic materials from local and salvaged materials to enhance the teaching-learning process. The student teacher at the end of training must be a field practitioner who prepares, facilitates and evaluates learning activities in respect to learners' differences, professional and socio-cultural environment by developing adapted communication strategies. The student teacher at the end of training must be a professional who performs four priority functions with the following competences:

1. Teaching-Related Competences: Plan and facilitate learning/teaching activities; Organize class work according to various situations adapted to learners; and Produce and use appropriate monitoring, supervision, evaluation and remedial education mechanisms.
2. Communication-Related Competences: Speak and write correctly the working language; and Work in a team, collaborate with the hierarchy and the education community.
3. Education-Related Competences: Work in discipline, respect deontology and professional ethics; Participate in the conception and realization of socio-educational activities; Sensitize and accompany the education community in the domain of environmental protection.
4. Analysis and regulation: Analyse students' results and class performance to evaluate pedagogic practices; Amend educational practices taking into account changes and innovations (MINESEC, 2013)

Worthy of note is the fact that these new syllabuses handle issues on the integration of ICTs on in Didactics of Educational Technologies and ICT subjects and the issues are not being reinforced in other subject areas that will provide for vertical integration and reinforced opportunities for ICT skills acquisition.

The concept of 'input' of the ICT based Teacher Training Program Planning

The duration of training to ensure acquisition of professional skills in the use of ICTs in pedagogy is another important factor. Teachers need effective training and time to use ICT and gain the needed skills and competencies to integrate them successfully into their classroom. Citing Donnelly et al. (2002), Vrasidas and Glass (2007) hold that teachers need 3–6 years of

sustained practice to integrate ICT fully into the classroom. Training in our primary teacher training colleges in Cameroon takes one, two and three years depending on entry qualification. Each teaching practice session only takes three weeks (MINESEC, 2013). This implies that the time for student teacher's acquisition of essential skills in the integration of ICTs is insufficient given that within these three weeks, there is a week for observation, another for guided practice and then autonomous practice which coincides with evaluation of the session.

Table 13: Time Allocation and Coefficients of the Subjects on the New Syllabus for TTCs

Training Domains	**Levels**					
	Three-year course: 1st Year (in hours)	**Three-year course: 2nd year (in hours)**	**Three-year course: 3rd year (in hours)**	**Two- year course: 1st year (in hours)**	**Two-year course: 2nd year (in hours)**	**One-year course (in hours)**
Teaching Practice	222	222	222	222	222	222
Didactics of Primary and Nursery School Activities	510	420	510	510	510	510
Science of Education Subjects	420	510	420	420	420	510
Bilingual Training	60	60	60	60	60	60
Total	1212	1212	1212	1242	1212	1302

Source: MINESEC (2013)

The time allocated for teaching practice, didactics of primary and nursery school activities were increased for each level above what prevailed in the former program. The teaching period covers an annual duration of 36 weeks and the average number of weekly teaching hours is 34 hours. The new syllabus has three types of teaching practice: Observation, guided practice and autonomous practice. One will notice from table 13 above that there are six weeks of teaching practice for each level per year. One would have expected more weeks for teaching practice given that student teachers need to put into practice much of the theory they have learnt. These sex weeks have weeks of observation, guided practice and autonomous practice which is very short for student teachers doing one year course to apply what they have

learnt. This is further exacerbated by numerous public holidays, cultural week, bilingualism, youth week activities that further interrupt the smooth flow of these teaching practice days.

2.5.0. PLANNING CONSTRAINTS TO ICT PROGRAM

The planning process of ICT programs for teacher training faces some difficulties which range from the context, organisations, strategies and technological disposition.

2.5.1. The Cameroonian educational context and planning realities

According to Mekolle (2020) in almost all countries the educational systems face the difficulties of insufficiency of resources which pose as a barrier or obstacle for smooth functioning. Therefore, Cameroon is no different when it concerns insufficient resources in general educational planning and planning ICT programs in particular. This is further given more insights for by Mekolle (2020) who holds that in most developing countries of which Cameroon is one, faces the problem of fund-raising educational projects and development which greatly affect the availability of resources needed for educational projects such as planning.

Furthermore, Mekolle (2020) focusing on Cameroon holds that Cameroon faces constraints ranging from persistent wastage, ability to attain commitments, meet up with set goals and objectives; while school enrolment has been fast increasing and has attained an approximate level of 96% as cited in MINESEC statistical Year book for 2015/2016, the government of Cameroon has significantly increase the budgets in educational process but still fall below the *education sector strategy* benchmark for 2015-2020 and 2015 Addis Ababa Action Agenda amongst others. Also, the world bank (2018) poor teacher quality as well as insufficient instructional material and text books account for poor learning outcome in Cameroon, which is as a result of insufficient resources in the planning and execution face.

Therefore, the Cameroonian educational system's problem of insufficient qualified teachers stems from insufficient state recruit, poor deployment and suboptimal trained teacher The world bank (2018) State schools experience the problem of insufficient teachers irrespective of the increasing number of learner enrolments, teachers are going on retirement while some are used by other state agencies and not adequately replaced. This has pushed the Parents Teachers Associations (PTA) known in French as Association de Parents d'Elèves et des Enseignants (APEE) to intervene and in the year 2014 and 2015 PTA teachers made up forty percent (40%) of the teaching staff in public schools' which is about 27,456 of the total number of teacher in government primary school (The world bank (2018). This explains the

reason for poor quality teachers even during training. Therefore, the process of ICT program planning process consequently suffers the same fate of quality due to insufficiency of qualified personnel and the respect of due procedure as well as availability of working materials.

Also, the world bank (2018) holds that there are challenges which are structurally significant and persistent. This has to do with teacher management and deployment. Most of which originate at the planning phase with no fixe policy on teacher financing, recruitment and deployment. Furthermore, due to planning issues the Teacher training programs with ICT program inclusive are highly theoretical and very limited in practical activities limiting or facilitating the teacher training colleges known in French as d'Ecoles Normales d'Instituteurs de l'Enseignement Général (ENIEGs) to produce or generate poor quality graduates (The world bank, 2018). However, in 2013 a new curriculum (training program) based on competency-based approach was initiated and implemented in 2014 with the aid of IDB (Islamic Development Bank).

2.5.2. Organisation of the educational sector

According to the world bank (2018) the educational system as a whole in Cameroon is plague with weak governance and management issues which serve as critical constrains to the planning of ICT program in teacher training colleges. The World Bank considers the educational institution in Cameroon to be fragmented. The educational system is divided into four core ministries (Basic, Secondary, vocational training, and Higher) with two sub-systems running parallel (the Anglophone and Francophone sub systems). The world bank (2018) holds that these fragmentations makes coordination very difficult, complicates cohesion, and negligence of a series of mechanisms, policy and resources to empower communities, personnel, and officials at the local levels on the improvement of quality and adequacy of service delivery.

Also, the world bank (2018) also hold that the Cameroon educational sector does not have a planned student learning national assessment framework. High-stakes examinations are used at the end of the primary or secondary cycles to test achievement. Also, Cameroon is very involved in PASEC assessment activities which has resulted in an early Grade Reading Assessment activity; which is not related to a national assessment framework which is systematic and consistent. Therefore, it is difficult plan programs especially ICT programs effectively given the national scale difficulties providing diagnostics, equipping decision-makers as well as educational planners with data on decision making policy planning guide as

well as decision making and reforms in tracking student learning (The world bank, 2018) the current situation is technically very limited especially at the planning policy stage. Also, the existence of four ministries of education makes it very difficult for quality data to be available. ICT tools are not effectively and efficiently used for EMIS (education management system) in Cameroon making the process very complex from the perspective of timeliness, completeness, and reliability. This greatly influences negatively ICT program planning process.

2.5.3. Strategies for educational sector planning

Billa (2021) holds that the Government of Cameroon has put a number of documented strategies for the educational sector as a whole. This done through strategic policy and planning papers such as:

a. Growth and employment strategy document (GESP), (DSCE in French)
b. Prospective vision of education in Cameroon by 2015, 2020, and 2035
c. Sectorial strategy of education and training (SSET), (DSSEF in French)
d. National policy of integral development of early childhood (NPIDEC), (PN, DIJE in French).

Billa (2021) holds that **t**he strategy document for growth and employment(DSCE) this strategy is essentially based on the sectorial strategies of education and health which emphasized on programs to access basic social services particularly education and vocational training**.** Also, The educational vision (aim) of Cameroon for the next 05 to 15years is based on the slogan Cameroon '*An emerging democratic and united country in diversity'* (Vision 2035)**.** While vision 2015 is found in two programs namely Millennium Development Goals (MDGS) and Action framework of Dakar with the slogan *'Education for All'* (EFA) certified in the year 2000 in Senegal, under UNESCO sponsorship**.** Cameroon has a developmental vision of being an emerging nation by 2035, and the educational system has a great role to play for it to attain this vision**.**

Furthermore Billa (2021) states that the sectorial strategy for education and training (SSEF) is a document that was elaborated in 2004 from a joint effort of all the ministries in charge of education in Cameroon, UNESCO, CONFEMEN etc. for a coherent and harmonized education system in Cameroon. Also, there is the national policy of integral development of early childhood (NPIDEC). This is a program for children from conception to 3 years of age purposefully to help them grow and prosper physically, mentally, emotionally, spiritually, morally and socially. These policy planning documents are acompanied by documents such as

the 1996 constitution and the 1998 law of educational orientation. The constraint here according to The world bank (2018) is a the implementation level, the implemtation show lapses in the planning of implemetation phase. This is not different from ICT program planning and implementation in teacher training colleges in Cameroon.

2.5.4. Technological sustainability

According to Pouezevara, Mekhael, and Darcy (2014) technology has a role to play in sustainability as well as it is sustainable in the planning process of ICT programs. This stage is concerned with identifying and selecting the technological tools that will serve over a given period of time as a result of its demand, appropriateness to the educational context of the country, easy to use, maintainable, and easy to repair. At this stage of planning complex decisions and choices are involved with regard to latest technological tools in market, their availability and affordability as well means of acquisition. The unfortunate thing about Cameroon is that technological tools both educational and non-educational are not fabricated or assemble in Cameroon. They are all imported which makes planning of ICT program and its materials and tools very difficult. This results in poor equipped computer laboratories, little mobile or shared technologies which results stand as obstacles instead of being facilitators towards students' professional development.

For this reason, Hepp et al. (2004) and Strigel et al. (2004) in Pouezevara, Mekhael, and Darcy (2014) hold that technological tools and material acquisition turns to be catastrophic when the assumption of one tool or material has the possibility to be used all over the system or the territory. This is one of the issues of planning of ICT program for Cameroon's teacher training colleges. It is so centralized that sometimes local reality is neglected in the course of planning, that is why some school's own tools they cannot use due to environmental and technical difficulties while some colleges with a favourable environmental and technical resources have little or no tools to be exploited. That is why Hepp et al. (2004) in Pouezevara, Mekhael, and Darcy (2014) reemphasize that centralized computer laboratory systems during planning is not a good idea because they are complicated resulting to higher maintenance expenses and also not very conducive with regard to teachers' engagement and exploitation as a cross-curricular technology. Therefore, the Cameroon educational program planners need to put in place measures to overcome constraints and ensure ICT program facilitate students' professional development by addressing issues of human, financial and technological cost.

2.6.0. SPECIFICITIES OF STUDENTS' COMPETENCE DEVELOPMENT

Professionalization is defined as a strategy to adapt curriculum and its related technologies (teaching and learning) to socio-professional needs and applicability (Doh, 2012). Students' professional development focuses on teacher training from the perspective of knowledge, abilities, skills, and competency development.

2.6.1. Teacher training and Competence Development

Kibinkiri (2014) defines professional development as investments or improvements in human capital (acquisition of knowledge, skills, and competences needed for work and life). The fundamental reason for training teachers is to ensure their professional development for the enhancement of the teaching-learning process. Professional development in teacher education also refers systematically acquired experiences which, over a sustained period of time, enable teachers to acquire and apply knowledge, understanding, skills and abilities to achieve personal, professional and organizational goals and to facilitate the learning for students. Competence development covers a broad range of activities that contribute to the training of teachers for both individual and systemic needs. It also refers to those formal and informal, as well as structured and unstructured activities, which maintain, improve and broaden teachers' skills, knowledge and ability to teach and the development of personal qualities for professional responsibilities (Husain, ND).

The Competence development of teachers on information and communication technology continues to be an urgent educational imperative (Phelps & Graham, 2008). Rhodes & Houghton-Hill (2000) contend that professional development of teachers is seen as an essential ingredient for creating effective schools and raising students' performance. Somers & Sikorova (2002) on their part add that the focus of professional development of teachers is the continuous updating of professional knowledge, skills and attitudes required of staff so that all students can learn and perform at higher levels. ICT in teacher education can provide more flexible and effective ways for professional development for teachers, improve pre-service and in-service teacher education and connect teachers to the global teacher community (Husain, ND).

Zwaneveld and Bastiaens (2010) holds that a teacher has to be a professional with respect to the content and pedagogy of the teaching of that content. This includes the fact that the teacher knows (reflectively) the process of designing teaching strategies and teaching materials, including ICT. Also, the teacher selects a diversity of learning tasks, adapted to the

students, using modern materials and tools, including ICT. If applicable he uses an electronic learning environment which enables time-and place-independent learning and which supports effective communication about the learning from different locations.

According to World Bank (2006) professional development in teacher training institutions creates and enhances human capital, contributes to the production of social capital (cohesion or social ties), increase economic growth which is an important determinant of economic development and good standards of living. For a teacher to be professional, to the extent of effectively integrating ICT in teaching, he/she must possess some basic competences. Kirschner, Wopereis, & Van den Dool (2002) in an overview of the professional competences of a teacher in relation to ICT came up with the following levels of ICT competences expected of teachers for effective integration of ICTs in teaching:

- Personal ICT competences: Teachers in training should have basic skills in Office applications and applying these skills in communication;
- ICT as mind tool: teachers should be able to use applications to support meaningful thinking and working;
- ICT as pedagogical tool: teachers should enhance their knowledge, skills and experience in resource-based learning and collaboration in digital environments;
- ICT as teaching tool: teachers should know the educational possibilities and impossibilities of ICT
- Social aspects of the use of ICT: teachers should not only be aware of ICT but also deliberately use ICT.

In the same line, Zwaneveld and Bastiaens (2010) citing a review by Van Eck et al. (2002) also mentioned the following ICT Competences required for teachers: The use of hardware, the use of software, the use of ICT in the learning process and the coaching of the students, the use of ICT in the neighborhoods of the teaching, and the use of ICT in further professionalization. When teachers acquire these competences, they become professionally equipped to integrate ICTs in teaching with innovative strategies that matches the content and suit policy expectation for quality output.

Professional development helps build and maintain morale of staff members, and is thought to attract higher quality staff to an organization (BusinessDictionary.com). To Vrasidas and Glass (2007). for teachers to be able to act as experts in integrating technology, they need

to have the knowledge, skills, and expertise to teach with technology. Some of these skills are research skills, lesson planning and presentation skills, communication skills as well as lesson evaluation skills using ICTs. Karolčík, Čipková, and Kinchin (2016) hold that the teacher's professional skills have a decisive role to play which is not replaceable. This role highly contributes success and effective implementation of digital technologies in the teaching process. Unfortunately, though, while many teachers are integrating ICT (with varying degrees of confidence and creativity), a significant number still remain hesitant, reluctant and daunted by the rapid rate of technological change (Phelps and Graham, 2008).

The use of ICT and the evolution of online learning environments provide an opportunity to innovate and reform teacher professional development. ICT allows access to knowledge and expertise that were previously unavailable, enabling new relationships and new models of professional development (Vrasidas and Glass, 2007). To Karolčík et al. (2016), it is particularly the teacher who selects the teaching strategies, teaching methods and procedures for the purpose of motivation, activation of students for learning, as well as better knowing and understanding of nature by students. King & Newman (2001) in similar perspective hold that since teachers have the most direct contact with students as well as a considerable control over what is taught and how it is taught, it is reasonably assumed that enhancing teachers' knowledge, skills and attitudes is a critical step in improving learner performance.

Also, teachers cannot hope to use the most sophisticated approach to student learning unless they have both the skills to use it and the desire to implement it (Shaw 2003). It is therefore necessary that the teacher is capable of critically assessing the available teaching aids and properly determine the scope of their application in the teaching. This can only be effective when these teachers themselves receive the right training required for these functions. To be able to prepare their students for life, they must know and respond to new needs and expectations of the society and purposefully develop competences of students in areas which appear to be extraordinarily useful and important for them to assert themselves in their lives (Karolčík et al., 2016).

Joyce and Showers (2002) observe that both teacher training and continuous professional development for teachers should be based on curricular and instructional strategies that have a high probability of affecting student learning. This view is supported by Vrasidas and Glass (2007) who hold that pre-service teacher education programs are by no means sufficient to prepare teachers to be effective users of ICT in the classroom. To them, ongoing professional development is essential for school improvement, and it can empower teachers to

address the challenges they face in their everyday teaching and to meet demands for teacher quality and school accountability. In similar perspective, Robinson & Carrington (2002) hold that professional development is most effective when it is an ongoing process that includes suitable properly planned training and individual follow-up through supportive observation and feedback, staff dialogue and peer coaching.

Professional development in teacher training institutions therefore creates and enhances human capital, contributes to the production of social capital (cohesion or social ties), increase economic growth which is an important determinant of economic development and good standards of living (Kibinkiri, 2014 citing World Bank, 2006). Technology has changed dramatically during the last few decades, but school curricula have not. Given that computers were initially designed to serve the needs of business and not education, imposing innovative technologies on old curricula is a serious challenge. The affordances of ICT require that we revisit fundamental assumptions about teaching and learning Vrasidas & Glass (2007). This makes continuous professional development of teachers in the domain of integrating ICTs in the teaching-learning process a paramount necessity.

2.6.1.1. The Concept of Teacher Training

In training teachers to be professionals they are exposed to professional knowledge. Professional knowledge is a body of knowledge that allows teachers to respond to the needs of their students within their educational contexts. Through professional knowledge teachers become knowledgeable of their students in terms of their diversity of backgrounds and how to relate to them appropriately. Teachers will be able to structure their lessons to meet the physical, social and intellectual development and characteristics of their students. Professional knowledge also enables teachers to know the content of their subjects and the curriculum as well as structure, sequence and pace the content they teach. This ensures that content is taught meaningfully. Teachers are also able to select the most appropriate teaching approaches to maximise students' learning.

The use of necessary teaching aids and Information and Communication Technology to contextualise and expand their students' modes and breadth of learning, is also informed by professional knowledge. Most teachers are unable to find effective ways to use technology in their classrooms or any other aspect of their teaching and learning life due to the fact that the use of technology in the classroom has not been encouraged and the teachers are not well trained in using ICTs in teaching as a means for educational sustainability (Ololube, 2006).

Professional teachers are also able to engage in reflective practice in professional engagement. Reflective practice entails looking at what the teacher does in the classroom, thinking about why it is done that way, and thinking about how it works and could be further improved.

Furthermore, it is a process of self-observation and self-evaluation by collecting information on teaching and learning, analysing and evaluating the information and making informed decisions about teaching and learning. Danielson (1996) stipulates four domains that guide teaching responsibility and these are planning and preparation, the classroom environment, instruction and professional responsibilities. In actual professional practice, teachers should be aware of their core functions and how to go about them. Training of teachers has to emphasise the importance of planning and preparation as effective facilitation is a result of adequate preparation. Hativa et al. (2001) state that good teaching is not only a question of having an excellent knowledge of one's subject but also involves adequate and thorough prior preparation.

Professional teachers are able to operate effectively at all stages of the teaching and learning cycle, including planning for learning and assessment, developing learning programs, teaching, assessing, providing feedback on student learning and reporting to parents/guardians (Ramsden 2008).Joyce and Showers (2002) observe that both teacher training and continuous professional development for teachers should be based on curricular and instructional strategies that have a high probability of affecting student learning. The reason why discipline experts without expertise in teaching may have challenges in teaching is failure to match discipline expertise with pedagogical expertise. The absence of pedagogical and curriculum expertise shows that delivery is not informed by theory or research hence problems in adapting the curriculum to suite students' needs, use of appropriate teaching and assessment techniques. The ability to monitor students' work and to provide constructive feedback to students as well appropriately redirecting teaching are important attributes that teachers without exposure to teaching and learning courses may lack.

David Melita Ole Katitia (2015) carried out a study about the background of the teacher preparation program in Kenya and how we need to prepare teachers for the 21st century. The paper also focused on whether the practising teachers are empowered to deal with the learner and practising teachers in schools. An educational program for both prospective and practicing teachers needs to develop their pedagogical content knowledge (PCK) which is how particular topics, problems or issues are organized, presented and adapted to the diverse interests and abilities of learners and it helps teachers understand how to transfer the knowledge of content

to the learners. The twenty first century teacher preparation should include the teaching of the special need learners in the regular classroom. Additionally, the current content on teachers' preparation may be revised to include skills in the handling of the special learners (Strawderman and Lindsy, 1995). Second, teachers will need to be fluent in the distinctive technologies that are in use in their specialized communities of practice (e.g., mathematics).

Consequently, it is suggested that teacher education preparation program should be carefully managed to incorporate all socio-cultural, economic and political aspects of life for the teachers to effectively serve their roles as instructional leaders in their spheres of influence. The paper proposes that the best approach to realizing this is for teacher education program to be based on relevant research findings focused on enhancement of teacher education program. An effective education program therefore will prepare teachers for the enormous tasks of the twenty first century. Education Educators need to prepare teachers to have enough exposure through the clinical school and use of the technology. This will prepare them to handle both the large classes and the diverse learners.

2.6.1.2. Pedagogical Training of Teachers for the Integration of ICT

Training student teachers on technologies should provide teachers with a solid understanding of the various media, their affordance and constraints. This is only possible when teachers are actively involved in teaching and learning with technology across the various disciplines. Teacher preparation should not be based on training teachers for computer literacy but should prepare teachers for using technologies to construct, represent and share knowledge in real life authentic contexts. Training student teachers on ICT should not be limited to learning about technology but how to use technology for constructing, organizing and communicating knowledge (Barron & Goldman, 1994). There are two levels of knowledge and expertise required of teachers who want to use ICT in the classroom, which are related to hardware and software and pedagogical applications of new information technologies.

Furthermore, it is observed that in teacher preparation programs, the main focus is given on fundamentals of computer, computer skills and information management. The right approach is to give proper attention on pedagogy. The student teachers should be trained in pedagogical use of ICT (Husain, ND). Teachers who become highly skilled in supporting pupils with ICT are skilled in three distinct areas:

- Such teachers are clear about the intentions of the learning activity for instance whether it is concerned with research or with writing or with editing or with visual creativity;
- The teachers are clear about the cognitive outcomes of the learning activity for example whether it is concerned with acquiring knowledge or with an analysis of particular material or with a synthesis of material from a variety of sources;
- Such teachers are clear about the management of classroom interactions such as when it is not appropriate to intervene or what to intervene about or why intervention needs to be employed at a particular time in order to refocus pupil attention on tasks (Husain, ND).

For effective preparation of student teachers to be professionally apt for 20th century teaching, it is required to provide pedagogical training to teachers in ICT. Unfortunately, the present teacher education curriculum does not provide to future teachers an understanding and knowledge about philosophical and sociological underpinnings of ICT in education. The student teachers should be trained to:

- Demonstrate understanding of the opportunities and implications of the uses of ICTs for learning and teaching in the curriculum context;
- Plan, implement and manage learning and teaching in open and flexible learning environments;
- Assess and evaluate learning and teaching in open and flexible learning environments (Husain, ND).

2.6.1.3. Teacher Training Approaches

Based on the fact that teachers are not provided proper training to use recent technology in the classroom, Husain (ND) presents different approaches of ICT teacher training. ICT teacher training can take many forms, such as training teachers to learn how to use ICT or teachers can be trained via ICT. A holistic form of training is however recommended, that will ensure student teacher's mastery of ICTs and be capable of selecting, adapting and using the appropriate ones to effectively facilitate teaching and learning. Figure 05 shows the different approaches of ICT applications and it is important to be considered when developing an ICT program in the teacher training colleges.

APPROACHES IN ICT TEACHER TRAINING

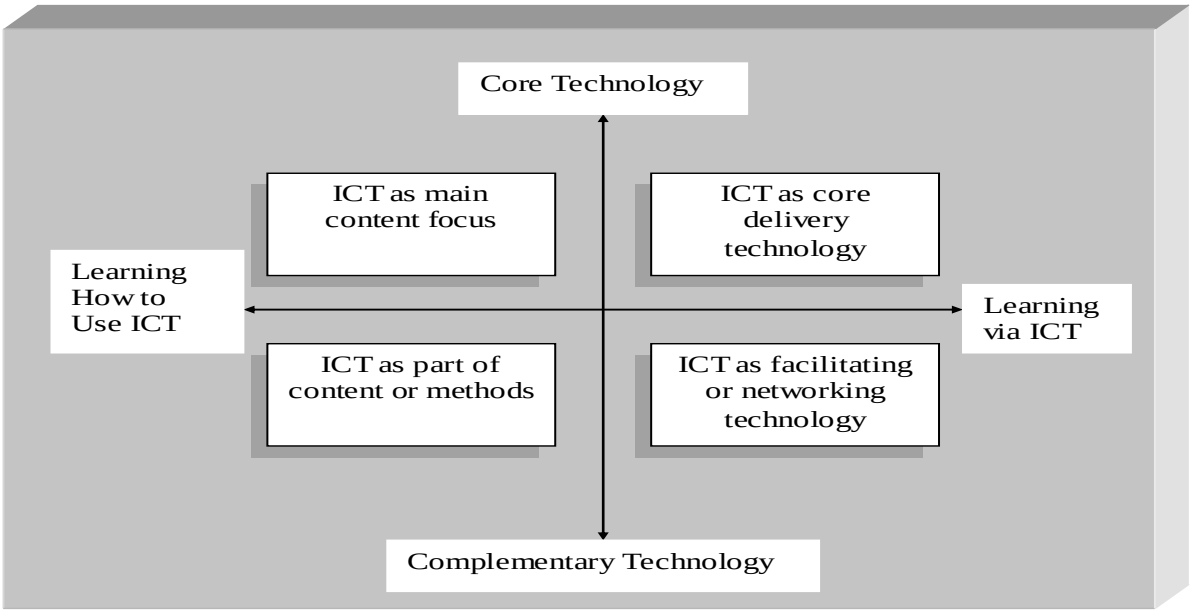


Figure 05: Adapted from Collis and Jung (2003)

(a) ICT use as Main Content Focus of Teacher Education: This approach is the focus of traditional teacher education programs. The approach emphasizes on training of teachers on how to use ICTs in the classroom. Student teachers are trained under this approach to select appropriate ICT tools and use them in instructional situations. The student teacher is expected to use ICT while teaching depending on the school's ICT infrastructure. In this approach of pre-service teacher education, the student teachers are expected to: be familiar with ICT components, such as computer, internet, computer conferencing, video conferencing; demonstrate ICT skills; Integrate ICT into subject; be familiar with computer-based instruction; be familiar with instructional technologies; use appropriate instructional technology in the classroom; use ICT in classroom teaching.

(b) ICT use as Part of Teaching Methods: This thrust of this second approach is on successful ICT pedagogic integration. In this approach, student teachers learn how to use ICT in their classrooms by actually being engaged in the process of ICT integrated training. They provide examples of real educators and learners using successful practices of technology to support instruction and learning in their classrooms. Student teachers access the learning materials and search the useful educational links during the training process and discuss on ICT pedagogic integration with students and teachers. In this approach of pre-service teacher education, the student teachers are expected to: use ICTs to construct, represent and share knowledge in real life authentic contexts; use technology for constructing, organizing and communicating

knowledge; understand the various media, their affordance and their constraints; think like experts in making instructional decisions; select media for appropriate use; structure learning activities; employ sound pedagogical strategies in real-life contexts.

(c) ICT as Core Technology for Delivering Teacher Training: ICT under this approach is used as the major way of providing the learning experience of teacher training. As presented by Jung (2005), the content of this approach does not necessarily focus on ICT skill itself but covers a variety of ICT applications. Computer-assisted teacher training, Internet-based ICT teacher training and Internet-based online teacher training are examples of this type of teacher training programs. These programs use the internet as the main delivery technology and focus on ICT-pedagogy integration in an online learning environment. In this approach of pre-service and in-service teacher education, the teachers are expected to: develop knowledge of the functioning and the services that the internet or virtual campus of the teaching institutions in which people work; use ICT in teaching as a means of didactic innovation; Know the use of ICT in the specific field of knowledge; Know the different ICT applications in the educational field.

(d) ICT used to Facilitate Professional Development and Networking

This form of teacher training programs assumes that professional development should be an integral part of daily practice for all teachers and the use of the internet would enhance continuous professional development activities of teachers. Husain (ND) considers professional development here as those experiences which systematically, over a sustained period of time, enable teachers to acquire and apply knowledge, understanding, skills and abilities to achieve personal, professional and organizational goals and to facilitate the learning of students. Professional development of student teachers here should cover a broad range of activities that contribute to the training of teachers for both individual and systemic needs. It may refer to those activities, formal and informal as well as structured and unstructured, which maintain, improve and broaden teachers' skills, knowledge and ability to teach and the development of personal qualities for professional responsibilities.

ICT especially the internet and web-based communication technologies are used in this approach to support teachers' professional development and networking. The student teachers are expected in this approach of teacher professional development to: manage ICT resources in the classroom; integrate ICT into the curricular design; use ICT to evaluate students and in the educational action; use ICT for the management of the school; update in the different

computer tools; know the theoretical and practical knowledge of ICT in education; understand the different ways of working with ICT in the different disciplines and areas. Of significance however, is for countries to adopt a holistic form of training that will ensure student teacher's mastery of ICTs and be capable of selecting, adapting and using the appropriate ones to effectively facilitate teaching and learning.

2.6.2. Students Construction of Knowledge

The new teacher training college syllabuses were drawn up following the Competence-Based Approach (CBA) and in respect to the methodological requirements of the development of the curriculum. According to MINESEC (2013), the process started with the writing of a Teacher's Referential of Professional Activities and the collaboration of field experts. These enabled designers to identify basic professional competences to be developed during the initial training of teachers. These basic professional competences selected were presented in a Referential of Competences used by the editorial team as supporting document to draw up the new curriculum. The new curriculum is a multidisciplinary curriculum which lays emphasis on common abilities otherwise referred to as "cross abilities" while integrating various practical aspects like simulation, practicum, various practical activities, case studies to name these.

The new curricular for teacher training colleges in Cameroon targeted the five domains of the content taken from the former syllabuses, which consist of; Bilingual training; Didactics of primary subjects and nursery school activities; Science of education; Educational technologies and Reinforced alternated teaching practice (MINESEC, 2013). To ensure professionalization of the training, the new curriculum had significant readjustment on the time allocated for some subjects as well as teaching practice.

2.6.3. Development of Students technological skills

According to the World Bank Group (2019) digital skills development is important today in developing a tech-savvy or techno pedagogic work force; this is to enhance advanced and basic digital tools to support or meet up with the increasing technological advances. This is very important in the educational system today for students' professional development because the word is going digital. This is why the planned and introduced Teacher Training Colleges ICT program in the TTCs program in Cameroon which was corrected, revised and effectively implemented in 2014, according to MINESEC (2013) has the following skills to be built following the respective themes in the ICT course:

- **General introduction**: Establish the link between the concepts, explain the objectives level by level, and study the methodology to elaborate a form ; State and explain ICT advantages and disadvantages; Present a brief historical background of ICT and its importance; Describe the physical structure/ hardware (visible parts) and software (invisible parts) of a computer; Describe the environment of a common operating system; Explain the functions of each computer peripheral; Apply the reading and writing operations using the keyboard and the mouse, and their importance in pedagogy; Differentiate various types of breakdown related to the handling of computer equipment; and develop maintenance and security strategies for computer equipment.
- **Functioning of an operating system**: Define and establish a link between the concepts; Present the characteristic components of an operating system; Identify the various types of operating systems; Identify the roles of an operating system; Manage files and folders; Manage users' sessions; Describe the components of an operating system; Demonstrate knowledge of windows environment: Workstation, start menu; and describe the functioning of a computer.
- **Knowledge of a computer / digital environment**: Differentiate the components of a computer system; -Explain the roles of components of a computer system; Describe the implementation process of component of a computer system; Operate the component of a computer system; identify and use the different storage devices, and identify the types of memories; Describe the basic information operations; and describe information processing and information flow processes.
- **Production of digital documents /Professional office automation**: Define and establish a link between the concepts: Explain the importance and use of each data treatment software; Present and Publish with computer; and describe the graphical interface of data processing software.
- **Internet technology and network etiquette**: Define and establish a link between the concepts; Explain the importance of the use of Internet ; Present the advantages and disadvantages of Internet ; Present the services offered by Internet ; Present the various current browsers; Explain the importance of services offered by Internet sites in schools; Communicate the research methodology through the Web ; Develop research strategies on the web ; Identify the various search engines and their role in the electronic research ; -Analyse legal, ethical, cultural and social issues related to the use of ICT in

education ; Identify the main legal problems related to the use of ICT Copyrights, cybercrime, piracy; and respect of intimacy and private life.

- **Pedagogic integration of ICT in class practice and evaluation:** Define and establish a link between those concepts ; Use ICT as a pedagogic object and pedagogic tool during class practice; Elaborate a lesson/class structure; Use the methodology to make a class/lesson note; Use methods, animation techniques, procedure, teaching techniques (to the Didactics of educational technologies); Develop tools and evaluation strategies; Identify the types of items; Develop items ; and identify the evaluation criteria using ICT tools.

Therefore, planning and development of TTCs ICT program takes into consideration not only ICT skills in general but digital skills in particular. It is for this reason that the World Bank Group (2019) hold that Cameroon has relatively been displaying a feeble though fair performance in developing digital skills and infrastructure as it was ranked the 149th of 176 in the countries world and the 17th in Africa in 2017 for the IDI (ICT Development Index) by the ITU (international Telecommunication Union. The skills acquired in schools have resulted the make Cameroon one of the countries with early-stage IT entrepreneurial activities even in education. This depicts the role of ICT program planning in professional development. However, the World Bank Group (2019) notes that Cameroon still lacks behind in digital skills and digital platforms. In education Covid 19 pandemic forced the ministries of education into e-learning based on digital skills and digital platforms. This initiative is picking up very slowly but steadily.

Furthermore, the World Bank Group (2019) attest to the fact that in the Cameroonian educational sector, Cameroon government spend less in education as compared to the average of educational sector investment in sub-Saharan and peer countries. This equally explains for low quality education in relevant skills for program development as well as job market preparedness. Cameroon government has however acknowledged these challenges and has engaged through the Education Sector Strategy document for 2020-2030 to developing digital skills through ICT programs in the whole of the educational sector so as to attained SDGs (Sustainable Development Goals) (World Bank Group, 2019). This is good news to teacher training colleges as they are supposed to be the base of digital skills development as they train and equip future teachers with digital skills from the ICT program which should result in students' professional development. The development of digital skills today is synonymous to quality education.

2.6.4. Improvement in students' Ability

According to Billa (2019) in education these days there is a lot of emphasis on the use of technology in planning, designing, developing and implementing educational program content. Also, Perlman et al. (2005) in Billa (2019) hold that this can be explain by the current trend of digital teaching and learning environment which facilitate active participation by making the teaching and learning process interesting, motivating, enable experience sharing, and create opportunities for repeated practice. Darling-Hammond, Hyler, and Gardner (2017) laid foundation to this view by stating that for students' abilities to be improving for profession development; tutors (instructors) have to choose the effective approaches. Choosing the right approaches means creating opportunities for professional learning which will result in professional abilities. It is for this reason that the 2013 TTCs program recommends competency approach of teaching exploiting explicit teaching method for ICT and educational technology programs.

Furthermore, Darling-Hammond, Hyler, and Gardner (2017) hold that the right instructional methods in teacher training institution are accompanied by strategies such as workshops that put acquired knowledge and skills in to practice, thereby enhancing students' professional abilities because it is based on human capital approaches which are evidenced based and leads to students' achievement. Also, Kerecsen and Pazdernik (2002) in Billa (2019) holds that www (World Wide Web) is confirmed in recent days to be enormously loaded with educational resources. These resources facilitate instructions by promoting content delivery, learning and practice. McEnergy et al. (1995) in Billa (2019) strongly support this assertion by acknowledging the possibilities of exploiting interactive Web-based instruction component to deliver instruction to students dispersed geographically.

Darling-Hammond, Hyler, and Gardner (2017) affirm that effectively planned and designed programs must also be effectively and efficiently implemented for students' professional abilities to be developed and enhanced. This because some factors which are more recurrent in the current in the Cameroonian educational planning setup are also recurrent in implementation. These factors amongst many others are; insufficient resources (human, financial and material), insufficiency in shared vision on quality means of transmission amongst actor, insufficient planning and implementation time (always rushed), poor planning and implementation strategies, and poor teacher fundamental knowledge. It is for this reason that Billa (2019) recommend the exploitation of digital resources in the planning and development of programs. The Cameroon teacher training colleges still have a long way to go

in developing students' professional abilities through the exploit of digital resources available for ICT and educational programs.

It is important to take note that in addition to World Wide Web (WWW) there are a number of social media forums such as Facebook and WhatsApp using internet services that are also used in teaching, training and educating people dispersed in different geographical locations. These are the forums to be exploited by African renaissance advocates, activist, sympathizers and educators to development knowledge, skills and competences that will make African renaissance and development a success in a relatively short time.

2.6.5. Consolidation of students' Competence

According to MINESEC (2013) the ICT program has a terminal comptence to enable the student-teacher to be able to solve problem situations exploiting resources from Information and Communication Technologies as to develop competences to teach Educational Technologies in primary and nursery schools. Therefore, competency consolidation in ICT program is realised through educational technology. According to MINESEC (2013) has the following basic competences to to be consolidated following the respective themes in the ICT and educational technology courses:

- **Information and communicaton technology course**

- **Competences**: C11, plan and facilitate learning / teaching activities; C12: Organise class work according to various situations adapted to learners, and work in a team, collaborate with the hierarchy and the education community; C31: Work in discipline, respect, deontology and professional ethics; C32: Participate in the conception and the realization of socio-educational activities; C33: Sensitize and accompany the education community in the domain of environmental protection; C41: Analyse students' results and class performance to evaluate the pedagogic practices; and C42: Amend educational practices taking into account changes and innovations.
- **Basic competences**: Solve problem situations making proper use of ICT tools in school; Solve problem situations basing on the management of an operating system; Solve problem situations basing on the knowledge of a computer/digital work environment; Solve problem situations related to the production of digital documents Using Internet to solve problem situations related to communication, legal, ethics and social issues; And present lessons while integrating ICT following CBA from an elaborated form.

- **Educational technology:** The terminal competence of educational technology holds that by the end of the course, the student- teacher should have acquired competences on the preparation and conducting his or her teaching /learning activities, through the integration of pedagogic Innovations in solving problem-situations.

- Competences : C11 –Plan and facilitate learning/teaching activities; C12 - Organise class work according to various situations adapted to learners; C13 - Produce and use appropriate monitoring/ supervision, evaluation and remedial education mechanisms; and C42- Amend educational practices taking into account changes and innovations.

- **Basic competences**: Solve problem situations making proper use of educational technologies tools in school; Prepare and present lessons using educational technologies in the context of CBA; and Efficiently evaluate students 'learning using educational technologies in the CBA context.

These competences of ICT and educational technology in TTCs curriculum (program) are in conformity with Darling-Hammond, Hyler, and Gardner (2017) who affirm that effective professional development has to do with well structure professional learning that produces as results changes in teacher practices as a secondary effect improve students' outcomes or productivity. It is important in the 21st century for teacher training to include sophisticated teaching types that will help the future teachers in developing learners' competences and deep mastery through challenging content, enhancing critical thinking, solving complex problem situations, reinforcing effective communication and skills, and above all create a sense of self-direction (Darling-Hammond, Hyler, and Gardner, 2017). Effective professional development through competency consolidation in TCCs in Cameroon is very possible through teacher training and refining of pedagogic skills.

2.7.0. CONCLUSION

This section has examined the writings, views and publications of diverse authors with respect to ICT program planning from the perspective of planning norms, planning process, planning, context, and planning constraints. National instruments, goals, assessment methods, and international instruments have been reviewed as factors of planning norms; diagnosis, implementation, monitoring, and evaluation are examined as factors planning process; financial issues, socio-political issues, health issues and resources have been reviewed as factors planning context; knowledge, abilities, skills, and competence are reviewed as factors of professional development.

EMPIRICAL FRAMEWORK

3.0. INTRODUCTION

This section shall present research works of various authors and results obtained from the perspective of: planning norms of ICT program, planning process of ICT program, planning context of ICT program, planning constraints of ICT program, professional development in pre-teacher education, and planning information and communication technologies for professional development.

3.1. PLANNING NORMS OF ICT PROGRAM

Edri, (2004) investigated on a study titled "Teachers planning and implementing ICT-Based practices". This study explores the planning processes among teachers integrating ICT, its impact on implementation, and the relation between teachers' planning patterns and school planning patterns. This study employed an instrumental case study approach aimed at analysing underlying issues, relationships, and causes that can be used to generalize beyond the case (Stake, 1995). The study took place in an elementary school (6–12 years old). The school comprises 350 children from the local neighbourhood. The 22 school staff members include the principal, twelve home-room teachers, who are in charge of each of the twelve classes and in this school are also in charge of introducing ICT into their class, and nine teachers who did not introduce ICT (such as music, physical education, art teachers).

The principal and the twelve home-room teachers were interviewed. These teachers' experience ranged from 12 to 30 years, with an average of 20 years. Fifty-four percent of the teachers have a B.Ed. degree, 31% a B.A., and 15% an M.A. Semi-structured interviews were conducted with the teachers, validated by relevant documents such as lesson plans and minutes of planning group meetings. Each interview lasted about 90 minutes, and was recorded, transcribed, and analysed by content analysis methods aimed at answering the general research questions. Results show that the school planning policy was found to be strategic, systematic, and participative. Three patterns of planning were found among the teachers: the "flow" pattern, the "flexible" pattern, and the "fulfiller" pattern. It was recommended that despite the time required and range of outcomes, the participative planning process is recommended for recruiting teachers' good will and efforts demanded for ICT introduction.

Fabunmi, (2003)studied the Historical Analysis of Educational Policy Formulation in Nigeria: Implications For Educational Planning and Policy. This was explanatory research that

aimed at establishing a trend of educational policy formulation in Nigeria and also examines the implication of Nigeria's experience on both educational planning and policy making in the country.

"It traces the formulation of educational policies right from 1914 up to 2004: the current moment. The British colonial administrators introduced an indirect rule policy in her colonies in West Africa. This Indirect rule had implications for both planning and policy formulation in education. The Nigerian example has a lot of implications for planners, who should be conscious of our local realities, particularly the complex nature of the Nigerian society and the gap in level of educational development amongst the various segments of the society. It is vital for policy formulators to initiate policies that will promote development, unity and equity in the country".

All the educational laws were outlined beginning from the 1882 Education Ordinance to the education laws of 1999-2004 and their implications to educational planning and policy were established. It was revealed that most of the colonial educational policies had the shortcoming of not taking into account our local peculiarities therefore participatory model of planning education and formulating educational policies is the most appropriate for a multi-ethnic nation like Nigeria.

3.2. PLANNING PROCESS OF ICT PROGRAM

Olubisi, (2012) conducted research titled "The study examined the effects of Strategic Planning on Corporate Performance using Babcock University as the case study". It also found out the effect of strategic planning on the management efficiency and effectiveness as strategic planning is important in corporate organizations. In this study the determinants of performance of a business were compared with those of the university. Those of the business organization involves technology, structure and size, communication, the human elements(management and employees) the larger market, competition, source of raw materials and supplies, legal structure, socio-cultural contents, globalization and so on while parameters for measuring performances in Nigerian universities are: the number of Students, the teaching indicators (graduation number of recipients of bachelor, master and doctoral granted by the university, teaching load of teachers), research outputs (number of publications that is books, book chapters, journal articles, conference papers and other scholarly articles, quality of research publication, total grant received), community service(social assistance, scientific meetings,

consultant activities, seminars and symposia for the local communities, technical services rendered).

The survey research method was used. In order to collect data for this study, secondary and primary data were used. Questionnaire was administered on employees (teaching and non-teaching staff) of Babcock University to get information. Data collected were analysed using descriptive and inferential statistics. There were three hypotheses: -The level of compliance with strategic planning has no significant effect on corporate performance and there is no significant relationship between the extent of strategic planning and corporate performance and the category of workers involved in strategic planning has no significant effect on how effective the plan is.

In order to analyse the data, descriptive statistics and the Pearson's Product Moment Correlation (r) the Statistical Package for Social Sciences (SPSS) version 16 were employed to establish the significance of relationship between the various variables used in measuring performance. The variables used in measuring performance were Sustainable competitive advantage, student enrolment, meeting set targets new projects and priorities against strategic planning.

The results of the hypotheses revealed that there is a significant positive correlation between strategic planning and corporate performance. The study therefore, concluded that strategic planning is beneficial to organizations in achieving set goals and recommends that universities and other corporate organizations alike, should engage in strategic planning in order to enhance corporate performance. Strategic planning can help universities to clearly define the purpose of the institution in a mission statement, provide a framework for decision making throughout the institution, reveal and clarify future opportunities and threats, provide a basis for measuring performance and increase productivity from increased efficiency and effectiveness (Uvah, 2005)

3.3. PLANNING CONTEXT OF ICT PROGRAM

Suleman, (2018) investigated on "*Influence of information and communications technology on effective educational planning for sustainable development of the education sector in Sokoto state, Nigeria*". The aim of the study was to find out whether ICT tools are available for educational planning and whether there exists a relationship between ICT and educational planning in Sokoto state. Two hypotheses and three research questions were stated. Descriptive correlational research design was employed population involving educational

planners, ministers and State Universal Basic Education. The instrument for data collection was a questionnaire titled "*ICT in educational planning for sustainable development*".

A sample size of 120 respondents was used in the study. In order to analyse the data**,** percentage, chi-square, and frequency were used in data analysis. Findings revealed that there is *no ICT gadget available in educational planning in Sokoto State, and there is a significant influence of ICT and its application on effective educational planning in Sokoto state.* Retraining and training of educational planning need to be introduced and promoted especially on the area of ICT usage and application in the planning of education in Sokoto state.

Ibrahim and Mofarreh, (2016)in his part worked on "Implementation of ICT policy in secondary schools in Saudi Arabia countries". The objectives of the research study were to understand the perceptions of the stakeholders about the implementation process of governmental ICT policy, it was also to identify factors that challenge and facilitate the implementation of the policy in secondary schools in Saudi Arabia. Organizational factors; practical or material factors; the individual; and the change process was seen as factors that affect the implementation of ICT policy in secondary schools. The study guarded us with an understanding of how the policies are implemented as well as make recommendations for the implementation processes. A case study mixed multiple methods was used with the help of documents, questionnaire and interview. Qualitative and quantitative data collection methods were applied. Ministry of Education, Principals, Managers of ICT in three districts, and selected schools in the three regions were interviewed and forty-five for questionnaires.

Data collected was analysed using CAQDA (computer-aided qualitative/quantitative data analysis) programs and for quantitative, SPSS (Statistical Package for Social Sciences) was used. Findings in this study revealed that Saudi culture is equipped with new technology (new media) and as a result there is the need for the Government to incorporate ICT into the national education system. This study revealed several factors which hindered the implementation of ICT policies in secondary schools in KSA including bureaucracy, scarcity of ICT policy planning and development processes, inadequate infrastructure and resources, poor training (skills, knowledge) and support (specialized personnel), time restraints, limited financial support, lack of leadership (coordination and management), the role of the individual (feedback), subjective norms, and change the process.

Russell (n.d) Carried a study that aimed at determining the nature and extent of Government school teachers 'anxiety in Queensland, Australia, consulted with undergraduate

students doing two years course in computer education. A total of 670 randomly selected teachers both in urban and rural areas and after removing some respondents, the researcher was left with 611 names and out of these 11 names was randomly removed from this group, and the remaining 600 names were used in this study. In addition, it examined the implications of cyber phobia for teachers' professional development. A questionnaire was used to find out sources of computer anxiety and gave opportunity for teachers to suggest solutions to computer anxiety.

They were three sources of computer anxiety: social embarrassment, the concerns about computer damage and nature and degree of task performance. Females constitute a majority of the teachers, but males reported significantly greater confidence with computers than did females (p, 0.05). Some 72% of the samples of 350 teachers were females. The findings show that teachers were very supportive of the use of computers in education, but reported moderately low levels of computer competence.

The results of this study are presented under four headings: computer access and usage with 91% agreeing with the proposition that 'the computer is a necessary tool nowadays', as concerns computer competence and anxiety only 22% of the sample agreed with the statement that they 'have no difficulty understanding the technical aspects of computers'. Then Some 71% of the sample had completed no computer-related subjects when they attended school, 66% had taken no specialist computing subjects at university, and 57% had undertaken no additional training with computers outside university. A number of suggestions for the reduction of computer anxiety are made, based on teachers' first-hand accounts, and an analysis of trends in the quantitative data. The implications of these suggestions for teachers' professional development are explored.

3.4. PLANNING CONSTRAINTS OF ICT PROGRAM

Onyeike C et al (n.d) came out with study titled "Constraints in planning and implementation of higher education programmes in rivers Nigeria" with the aim of investigating the constraints involve in educational planning in six higher institutions. A sample of 450 administrative and senior lecturers were drawn out of a population of 750-unit heads. Simple random was used to get the sample that was given a 30-item questionnaire which was titled "Deans, Heads of Department and Senior Lecturers Assessment Questionnaire. In order to answer the research questions, standard deviations and mean scores were used while to test hypothesis Z- Test at P-value of 0.05 or 5% level of significance was employed.

Study results show that funds are inadequate, planning is done without accurate statistical data, there is insufficiency of qualified manpower, and funds misappropriation and political influence all negatively affect planning. Findings also revealed that there was significant difference between female and male unit heads on the perception of constraints to planning and implementation of higher education programmes. Recommendations were made based on findings among others that Federal and state government should make available enough money to the educational sector as to encourage educational planners and other professionals in planning to do their job effectively.

Tondeur et al (2016) carried out a study titled "Responding to challenges in teacher professional development for ICT integration in Education". The research literature reports many different contexts of successful and unsuccessful teacher professional development program (TPD) that took place all over the globe. The method used to collect data was thematic discussion with working groups. Many challenges and four (4) cases of successful TPD were discussed by the working groups. These groups had three foci for discussion namely: -engaging all stakeholders in developing a shared vision for ICT in education, engaging more teachers in communities and networks for professional development, reducing the gap between educational research and practice. Some of the cases were sighted like TPD for technology integration in Kenyan schools.

This was achieved through peer learning and sharing of experiences and opinions between schools since each school delegated a representative and the interactive workshop. school-level sensitization workshops were organized where representatives from the Ministry visited each school with the aim of demystifying ICT integration school-level sensitization workshops were organized where representatives from the Ministry visited each school with the aim of demystifying ICT integration. The knowledge gained to develop an ICT-policy plan. A range of challenges such as the importance of the context (theme 1: contextualization). This Kenyan case illustrates how schools are influenced by multiple historic, social, cultural, economic, and political contexts (Krug and Arntzen, 2010), e.g., school leadership faced daily challenges produced partially by the Kenyan Ministry's new curriculum policy on ICT integration, but also because of the specific social, physical and cultural conditions of each school's context (e.g., lack of electricity or power breakdowns; lack of time, the number of pupils).

It was concluded that effective preparation of pre-service teachers for technology integration requires attention to- all the stakeholders at different levels in the education system,

local factors (cultural and structural), but also demands similar attention toward the relationships between the themes (Kay, 2006; Tondeur et al., 2012). At the same time several members stressed the importance of systematic (gradual and Engaging teachers in a form of inquiry learning is another common characteristic across these cases. The nature of the projects varies but typically teachers are engaged in inquiry leading to planning and developing resources for teaching with ICT and subsequently sharing what they produce with colleagues (Agyei and Voogt, 2012). Some of the challenges include: social and cultural factors, lack of teachers' technological, pedagogical, and content knowledge inadequate infrastructure, limitations of Internet diffusion, linguistic differences, and geographical separation. Many lessons resulted from the discussion that led to a suggestion of a conceptual model for linking research with practice (Albion, Tondeur, Forkosh-Baruch, & Peeraer, 2015).

3.5 PLANNING MODELS AND PROCESSES

It is important that at this point we make mention of planning models. A model helps in the understanding of phenomenon. Rational and interactive models are the broad categories of planning models (Adams, 2006). The rational model purport that planning is bureaucratic, systematic and objective. The methods of planning here follow universal applicability. On the contrary, with interactive models, planning is highly participatory, subjective, adaptive and less dynamic. Interactive models view planners as those having alternative approaches to solve organizational problems. There is need to plan the use of ICTs taken into consideration the kind of planning model. A good model should be interactive and yet rational as seen in figure 06 below.

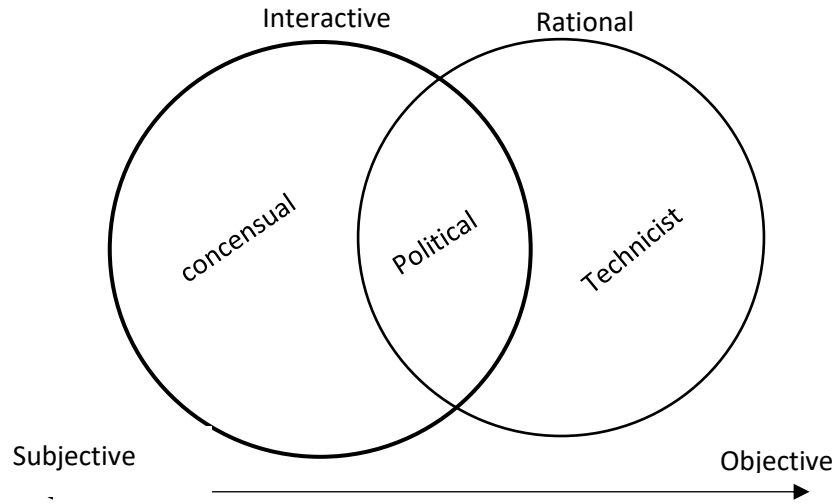


Figure 06: Interactive & Rational planning model adapted form Adams (2006.)

According to Adams (2006) model seen above, Technicist model is the most rational model. The Technicist model stresses on hierarchical and centralized administration to ensure

strict compliance in the school organization. Political model is part and parcel of interactive and rational models. It is expert driven and assumes a linear process of decision making. Political models see education as an open and social human system which is adaptive and flexible. This model rejects assumption of rational decision making. Interactive model is a consensual model which focuses on interactive and participatory approaches. Here, there is exchange of opinions, communication, agreement on issues and participation. In consensual planning approach, school administrators, teachers, parents, students are allowed to participate in deriving objectives and goals, reflecting ideas, assessing needs, negotiating priorities so as to bring outstanding positive changes in the educational system. In Cameroon there is need to use all the models: the technicist and Interactive model in order to plan ICT programs.

Some theories of planning were developed by the following: -

Combs theory of planning (1970): Combs (1970) combines social demand and man power approaches in planning. He stressed that every educational planner must take action against fewer jobs, the wrong kind education, wastefulness, and cost rising faster than revenues. This theory has many implications to educational planning. Planning should take into cognizance, the social and economic plans of the country. Individual demand for education as well as the needs of the society should be considered in planning.

Bereday's theory of planning (1977): Bereday (1977) maintains that a set of decision and the process of preparing the decision are elements which are evident in educational system planning. The theory suggests that planning in education is carried out in a systematic way. By implication, educational planning is systematic and not haphazard, and decisions are seen as turning points in educational planning.

Aurins (1969) came in to insist that empirical research in the service of educational planning is necessary a task-oriented research supportive function for planning. Research results are needed for future planning. Aurins theory is important in educational planning because parents, teachers, planners, community members, students contribute information for educational planning.

Griffiths (1962) also highlight some basic ideas in modern system of educational planning. Culture of each country, available resources, and administrative convenience determines the system of education in any country. The progress of the child from one class to another should not be based on knowledge but on his or her age. Teachers should be considered when planning for courses allocation.

Wolf (1976) identifies the future need for workers, demand for training places and economic yield to be recouped from training as the models of education system planning. The future need for workers is determined based on the present demand and the rate economic growth. Economic yield to be recouped from training model compels the training expenditure with the financial returns. The rate of return of cost benefit approach to educational planning is considered in this theory.

3.6. COMPETENCE DEVELOPMENT IN PRE-TEACHER EDUCATION

Kibinkiri, (2014) carried out a study titled "*The role of E-learning on the professional of student-teachers in Cameroon*". The study was aimed at finding out challenges faced by student-teachers in the implementation of e-learning. Eight(8) hypotheses guided the studies:- Computer-Based Direct Instruction has a significant influence on the professional development of student-teachers, Asynchronous Experiential Learning has a significant influence on the professional development of student-teachers, Asynchronous Collaborative Learning has a significant influence on the professional development of student-teachers, Internet-Based Problem Solving has a significant influence on the professional development of student-teachers, Online Content Representation has a significant influence on the professional development of student-teachers, Online Learning Environment has a significant influence on the professional development of student-teachers and the use of e-learning has a significant influence on the performance of student teachers in educational technology.

A survey of 796 student-teachers drawn from three (3) Higher Teacher Training Colleges and from eight (8) Teacher Training Colleges in Cameroon. In order to collect data a questionnaire was used and an experiment was conducted with 191 student-teachers of the Higher Teacher Training College was conducted using blended learning. Samples of the study were gotten through Purposive, cluster, simple and systematic random sampling techniques. Several tests were used to test the research hypotheses including: - t-test, One-way ANOVA and Correlation Coefficient. Results of the study proves that e-learning has a significant influence on the professional development of student teachers, slow Internet lines or access speed constitute a serious challenge to effective e-learning, Internet-Based Problem Solving and Computer-Based and direct Instruction have an unprecedented role in fostering the professional development of student teachers in Cameroon.

Recommendations were made based on the results one of which was that training institutions should embrace ICTs and become more flexible by adopting learning approaches

that are dynamic and multi-dimensional as problems in education are becoming more complex. It was also recommended that teaching institutions should reorganize their mission and vision statements with an effective strategy and policy for e-learning.

3.7. PLANNING INFORMATION AND COMMUNICATION TECHNOLOGIES FOR COMPETENCE DEVELOPMENT

Eze, Adu, and Ruramayi, (2013) investigated on the topic "The *teachers and the use of ICT for professional development in Botswana*" The objectives of the study were to find out how teachers use ICT for their professional development, the type of skills teachers need to acquire in order to be effective in an ICT and how ICT impact professional development. The study investigated the experiences of teachers using ICT in Botswana and even highlighted some ICT policies and infrastructures in Botswana. Findings from the research shows that ICTS promote the application of network technologies to research and collaborative planning and helps teachers break loose from the isolating environments that the teaching profession had imposed on them in the past. It was discovered that ICTs change the role of the teacher, makes them move towards autonomous learning and *promote of collaborative learning.* It was recommended among others that teacher training institutions, professional development schools, societies and public educational agencies must continue to identify study and disseminate examples of effective technology integration that answer professional development needs.

Educational planning and competence development

Mau, (2000) investigated on a work tilted "Educational Planning and Academic Achievement of Middle School Students: A Racial and Cultural Comparison**"** Middle school students from different background were surveyed on planning, educational aspirations, and achievements. Significant differences in mathematics, science, and reading proficiency among racial and sex groups also were indicated. Implications for counselling are discussed. Findings based on a nationally representative high school student sample indicated that students of minority background are less likely to access guidance counselling for making important educational and vocational. The primary research questions were the following- how active are these students in planning their high school programs? How do these racial-ethnic and sex groups compare in their levels of academic achievement as well as educational aspirations? The data of this study were obtained from the National Educational Longitudinal Study of 1988 NELS:88), sponsored by the National Center for Educational Statistics (NCES, 1990a).

The racial-ethnic composition of this sample was 1,527 Asian American (6.2%), 3,171 Hispanic (12.9%), 3009 Black (12.2%), 15,692 White (63.8%), and 924 Native American (3.8%) students. Students completed a 45-minute self-administered questionnaire in their classrooms. The questionnaire was designed to collect information about a wide range of topics, including students' and parents' backgrounds, perception of self, students' educational and vocational activities, post-graduation plans, and aspirations. Students also completed an 85-minute battery of cognitive tests (reading, mathematics, science, and social studies Data). The first survey question ("*How often have you talked to the following people about planning your high school program*?") was analysed using a chi-square test of independence on whether or not students consulted a helper (at least once or not at all) and students' ethnic origin (2 X 5) and sex (2 x 2). The percentages of each racial group's response to each helper category also were calculated

The secondary survey question ("Since the beginning of this school year, have you talked to a counsellor at your school, a teacher at your school, or another adult relative or friend [other than your parents] for any of the following reasons?") was also analysed using chi square for each reason. Overall results suggested that minority students, especially Black students, were relatively more active than were White students in planning their educational programs and White students were less likely than were other groups to ask for help. Findings were based on a younger population, and it is unclear whether increased attention and effort were given to younger minority students by counsellors, or if less effort was given to the older minority students.

3.8. PLANNING INFORMATION AND COMMUNICATION TECHNOLOGIES FOR COMPETENCE DEVELOPMENT

Olakulehin, (2016) carried out a study titled "*Information and communication technologies in teacher training and professional development in Nigeria*". This paper examined the contemporary teacher training and professional development in Nigeria as an example of the experiences in developing countries of the world. With one of its objectives being Information and Communication Technology at the centre of the pre-service training and continuing professional development of the Nigerian teacher. Another objective of this work was to find out some challenges in terms of applying technologies into teacher education. A model and a framework were proposed on better ways to implement ICTs into preschool Teacher education. Also, it examined the benefits of adopting technologies in pre-service and in-service training, professional development and teacher education.

These challenges include limited ICT infrastructures (in terms of facilities and competent staff); lack of information and information illiteracy in teachers and teacher trainers-technophobia; poor or non-existent internet connectivity; inadequate learning resources including related educational tools, course curriculum and other learning materials; attitudes of teacher-trainees and teacher trainers which indicates a gross lacking in independent learning skills and reluctance to take responsibility for their own learning; software license and highly prohibitive costs associated with the; maintenance and technical support as well as poor power supply in most parts the developing regions of the world, a problem that is peculiar to Nigeria in particular. Countries must be able to benefit from technological developments. To be able to do so, a cadre of professionals has to be educated with sound ICT backgrounds, independent of specific computer platforms or software environments. The disparity in access to information and communications technology in Africa is occasioned by many and diverse problems, including, low bandwidth for internet access, lack of funds to embark on full scale computerization, irregular supply of power, inadequate functional telephone lines and other infrastructural facilities needed to support the efficient and effective introduction and development of the technology. Nigeria is also short of manpower for effective utilization of software and for maintenance. Qualified programmers, engineers and technicians are equally difficult to find and when they are found, the (public) education sector cannot afford to retain them, as competition from the private sector is fierce. This lack of manpower breeds a compendium of other problems.

Teachers can only pass on skills and ideas to the learners, if they are masters of their trade, and they are at the cutting-edge of knowledge and developments in their disciplines. This is unfortunately not the case here in Nigeria, most teachers at all sectors of the education system have minimal or no ICT skills and hardly use existing opportunities to develop them. However, the use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in Education in education involves the adoption of general components of information and communication technologies in the teaching learning process.

The continuum model indicates that the skills of teacher trainees flow from the emerging to the applying into the infusing and then culminates in the transforming processes of the educative activities which takes place in schools. The Emerging approach is the first

stage of ICTs skills development in teachers, here the focus is on appreciation of technical functions, components and general uses of ICTs, especially for education and training.

3.8. COMPETENCE DEVELOPMENT AND PRIMARY TEACHERS

Sullivan and Sullivan, (2006) carried out a study on effective Follow-Up Strategies for Professional Development for Primary Teachers in Namibia**.** It emerged from a three-year research study of a professional development programme for mainly unqualified Namibian primary school's teachers. The program and its role within the newly reformed Namibian education system was examined. Effective follow-up strategies used within the professional development programme were two namely: trainer follow-up strategies and teacher follow-up strategies. The trainer strategies were lesson observation, learner assessment, progress meetings, checklists, trainer role, and demonstration lessons. The teacher strategies were: - workshop hand-outs, diaries, self-evaluation forms and peer coaching. The article concludes with an examination of the effectiveness of these strategies.

These include lesson observations, progress meetings, checklists, learner assessments and demonstrations. The article examines the strategies used by the teachers: workshop handouts, diaries, self-evaluation forms and peer coaching. The professional development programme had three parts: a needs assessment exercise (January to May 1995); four training circuits (June to December 1995; January to June 1996; July to December 1996; January to June 1997); an evaluation exercise (July to September 1997).

Action research approach and a variety of data collection methods including semi-structured and unstructured observations such as lesson observations, learner assessments and documents (O'Sullivan, 1999). Results show an important role that follow-up play with respect to professional development and the usefulness of using a number of follow-up strategies. They effectively support teachers' implementation efforts. The second is that follow-up is worth serious research attention. I hope this article inspires further research into follow-up strategies; for example, research that explores the views of teachers on the usefulness and effectiveness of professional development strategies would be worthwhile Bayar, (2014).

The Components of Effective Professional Development Activities in terms of Teachers' Perspective. This study seeks to provide the meaning of effective professional development activities and to offer a list of key components inherent in any effective professional development offering. The researcher randomly visited 18 elementary schools and asked teachers to report the number of professional development activities in which they had

participated over the past 12 months. From this population, the researcher selected 16 teachers (8 males and 8 females) to interview, all of who had indicated that had participated in at least three professional development activities over the preceding 12 months. Research questions are: - What is the meaning of effective professional development activities? What are the components of effective professional development activities?

In an effort to triangulation the findings in this study, the researcher employed the following techniques for data collection: interviews, a brief survey (brainstorming), and document analysis. First, the researcher conducted open-ended interviews with 16 selected teachers. The researcher asked the participants to explain the meaning of effective professional development and to discuss the components of an effective professional development activity based on prior personal experience. They were asked to generate a list of the key components to be included in an effective professional development activity. Additionally, document analysis of result was performed. The findings indicate that any effective professional development activity should consist of the following components: -a match to existing teacher needs, a match to existing school needs, teacher involvement in the design/planning of professional development activities, active participation opportunities, long-term engagement and high-quality instructors. The results of this study hold special importance to policymakers, researchers, and educators. The researcher recommended that the Ministry in charge of Education should consider the findings providing more effective professional development activities for teachers as this will make students to be more competitive.

3.9.0. CONCLUSION

This section has presented and discussed empirical (scientific) works from the perspective of planning norms, planning process, planning context and planning constraints. Empirical review has examined the research work of different authors, their findings in similar research works and how they are related to this study.

THEORITICAL FRAMEWORK

4.0. INTRODUCTION

This section presents the respective approaches, models and theories related to ICT program planning and student's professional development. therefore, theories of Rationality Planning Theory, Increment planning Theory, Consensus planning Theory, Technological Pedagogical and Content Knowledge (TPACK) and Social Learning Theory are closely examined in relationship to the work.

4.1. Rationality Planning Theory

This theory emanates from the classical scientific school of thought spearheaded by Taylor. In the planning process, standard performance and standard methods are observed which lead to standardized steps. Rationality approach in planning focuses on the influential point in planning which provokes policy change through the means of individual, a group of individiduals known as the core-executive, or an organisation incharge of decision making (Akintson (2011). The ICT program of teacher training colleges in Cameroon is not planned by an individual but a group of individuals designated by the state officials such as the president of the Republic, Prime minister or minister. Therefore, Rationalist planners seek to question the possibility of an individual engaging in planning research, policy making, its implementation and monitoring. However, given that in the Cameroonian educational system planning is not in the hands of an individual but the policy is defined by an individual (Head of state), the focus now shift to the group of individuals or bodies charged with planning, implementing, and monitoring ICT programs in teachers training colleges.

Therefore, Mukhopadhly (2015) consider for the principle of rationality to be effective in the planning process, the individuals or bodies (planners) involved need to engage in the task of developing quality alternatives before engaging in rational planning activities based on data obtained from evaluation. The 2013 ICT and Educational technology program for teacher training colleges in Cameroon was a product of rational decisions by authorities based on feed back gotten from evaluations (MINESEC, 2013). This is because the rational decision making process took into consideration the empowerment of educational planners in scientifically evaluating policy alternatives in relation to decision making for ICT program in teacher training colleges. This is because the new ICT program was suppose to be competency based, so as to ensure student professional development. Public input came from grass root teachers and

educational administrators, who examined and took into consideration contextual realities and factors that influence professional development.

ICT program policy in Cameroon is defined by the head of state and it was an engagement taken in 2001 (Josue, 2007). This explain why comprehensive rationality demand that elected policy makers should tilt their work towards tranforming values into policy as they are assisted by group of individuals or bodies put in place to operate in a more logical and neutral manner (John, 1998 in Akintson (2011). Therefore, according to Akintson (2011) the bases of comprehensive rationality model is are the assumptions that: values should be separated from facts in attaining goals,objectives and assessssing means to attain them, policy preferences should be ranked to faciliate educational gain resulting from its consistency; respecting the linear policy making nature through the identification of aims, the means of attainment, and chosing the most reliable means of attaining these aims; and its analysis should be made with respect to relevant factors (Mukhopadhly, 2015).

Also, Iyoriohimi (2019) hold that formal ratonality is oriented on means which is more focused on facts and not on values with its usage having high frequency in bureaucracies. While on the other hand sutbstance rationality is more focused evaluations as outcome rather outcomes rather than means (Faludi, 1988 in Iyoriohimi, 2019). Therefore, making use of the two in ICT program planning will result in planning a factual means and etablishing its outcomes through the process of evaluation. This is because formal rationality is more scientific and contectual while subsistance is more focused on effectiveness and efficiency. Therefore, ICT program planning for student teachers' professional development is supposed to be based on factual data that will result in building rich experiences (knowledge, skills, aptitudes, and competences) in learners, so as to ensure professional development.

Planning based on rationality has as mission to promote and maintain respective means of of achieving educational societal welbeing through the setting up of objectives exploiting scientific knowledge, examining the problemunder resolution, gather date, establish alternatives, drawup a crteria of choice following an objective pattern, so as to enable the identification and a balance exploitation of the strengths and weakness of each alternative developed (Iyoriohimi, 2019). After all these is done, the alternatives will the be sorted and the most appropriate one to resolve the given phenomenon chosen to appropriately resolve the problem or issue under resolution.

Rational planning model according to Taylor (1998) in Iyoriohimi (2019) can be best associated to the plannng process with a series of systematic stages:

i. Problem definition and settup of goals
ii. Alternative plans or policy identification
iii. Alternative plans or policy evaluation
iv. Plans or policy iiplementation
v. Plans or policy effects monitoring

These stages according to Igbinosa (2002), Ikelegbe (2006), and Egonmwan (2009) in Iyoriohimi (2019) can summarised planning into examining all available alternatives, examining their effects or impact, and chosing the best alternative from the alternatives (identification of problem, identifiation of solution, and implementation of the identified solution). In other words planning should firstly be considered as a technical exercise, secondly that it is characterised by comprehensiveness in chosing frome a wide range of alternatives, and thirdly as an essential and allocative mechanism for efficient resource allocation. The ICT program of TTCs in Cameroon go through these process processes especially at the planning stage, to ensure that the objectives, content, and resources in general are effectively and efficiently chosen and alocated for the program to enhance student teachers' professional development.

Rationality planning theory serves the purpose of planning norms and planning process because it outline and explains criteria and stages in decision making in the planning process. In this light, Brooks (2002) in Iyoriohimi (2019) present the following applicative stages to rational planning model which is closely related to ICT program Planning:

Stage 1: Define, verify and detail problem

Every planning activity is provoked or inspired by a problem. Therefore, for planning to be purpose driven the planners has to start by first of all defining the problem under resolution. In so doing they will define the problems, the goals or objectives to be attained, and gather data or information. If this is not properly done, then the implementation face phase will face a series of problems. The problem has to be properly identified and diagnosed inorder to properly solve it.this goes seem for the 2013 ICT program for TTCs, the planning was based on the fact that the old program which not meeting the nneds of the changing times and students demands it constructing knowledge, developing skills and aptitudes, and reforcing competences that ensures effective and efficient professionaldvelopment (MINESEC, 2013).

Stage 2: Development of all potential solutions

Alternatives to solving the problem has to fully be exhausted as to determine prilimary inplementation of planning. This activity is not done by a single individual but a group of individuals or bodies. The planning for 2013 ICT program for teacher training colleges was done by team of teachers, school heads and pedagogic inspectors (MINESEC, 2013). This was to build diverse ideas and tap from diverse experiences, with technology as one of the tools being used collecting information.

Stage 3: Developing objective assessment criteria

At second stage alternatives were developed, these aternatives need to be measured and evaluated before the potential most successful one can be chosen. The assessment process dtermine the strenghts and weaknesses of each alternative. This activity facilitate the taking of critical decisions. This is a very essential stage in the planning of ICt program if it is intended to develop students' professional development.

Stage 4: Selecting the best information

After evaluation has determined the most potential alternative, a decision has to be made on choosing the alternative. This is because the strategies or alternatives have been exhausted and implementation is the desired next step.

Stage 5: Implementation of chosen alternative

After the best alternative has been chosen, it has to be implemented to ensure its preliminary monitoring and determine results. This stage is more concern with building or renovation in planning.

Stage 6: Monitoring and evaluating outcomes

This step has to do with the final stage of monitoring and evaluation to determine general outcome of the chosen alternative in the evaluation process.

Stage 7: Feedback

This is the final but not the least stage as enable planners to revisit the chosen alternative or existing alternatives so as to modify or reinforced the alternative under planning implementation. When the new ICT program was introduced in 2013 at the end of the academic year it was evaluated and modified based on insights from feedback, before fully implementing

it in 2014 to ensure effective and efficient professional development. The 7 stages are better illustrated by the diagram below.

Stages of Rational planning model in decision making

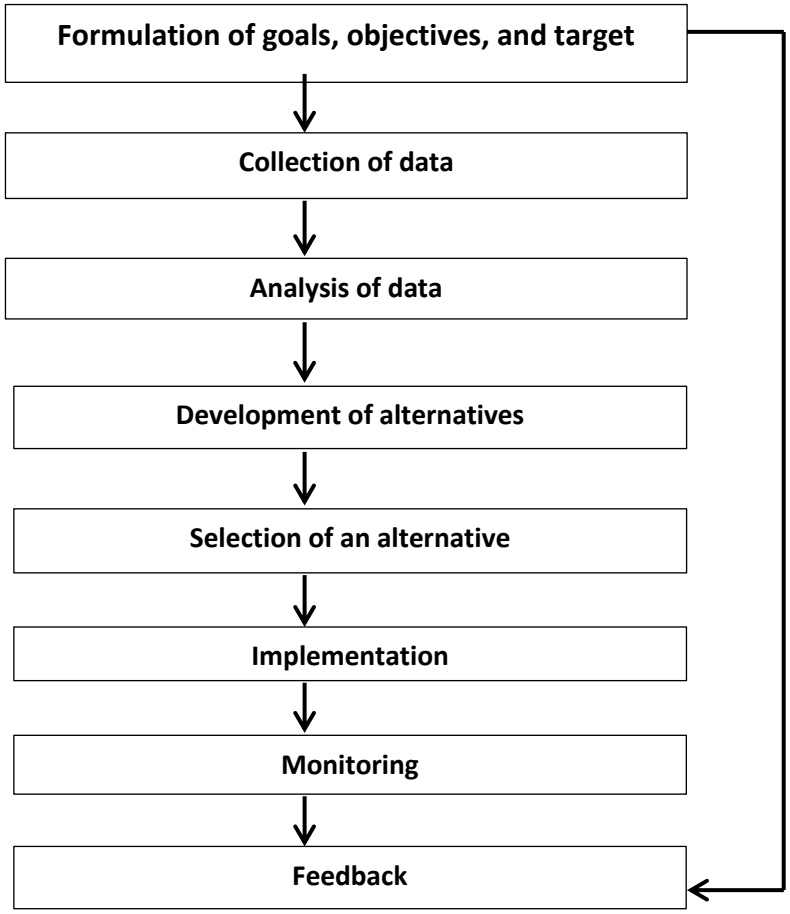


Figure 07: Stages of Rational model in decision making

Source: Adapted from Iyoriohimi (2019)

Rationality planning model in planning ICT program for TTCs serves as an apt and practical planning process, because it has its roots in scientific reasoning which exploit modern technology such as ICTs in all the planning phases. It also gives opportunities for a series of alternatives to be examined and the best chosen and implemented, making it very productive and result oriented. Given that the 2013 ICT program for teacher training colleges is meant for developing professional knowledge, skills, aptitude and competences, the rationality planning model best suit it.

4.1.1. Criticisms of Rationality planning model

Irrespective of its strengths rationality model of planning has been subject to a number of criticisms. Rationality model of planning has been criticised for its strong orientation

towards means and focusing very little on outcomes which makes it content less due to focus on procedures and neglect their content (Leoveanu, 2013 in Iyoriohimi, 2019). Also, Taylor (1998) consider the model to be too abstract because it only presents definition of planning and neglect the practical application and is consequences on the final product such as the ICT program for teacher training colleges. In this case, if it is fully exploited in the planning of ICT program for teacher training colleges, the program will turn out to be more theoretical than practical and will negatively influence students' professional development.

Also, Campbell and Fainstein (2003) and Taylor (1998) in Iyoriohimi (2019) asserts that rationalist planning model demands a level of knowledge that is exceptional, exceptional analysis and organisational coordination to digest and understand its relevant information in its entirety. This makes rational planning irrational because irrespective of the steps taken to arrive at planning decision, the decision will not till be entirely comprehensive nor rational because it is still based on anticipation of a few. This is in conformity with Sandercock (1998) who holds that the rationalist model of planning is 'planner indisputable' because the planners are considered to be all knowing and bases on objectivity and their professional expertise to decide for an undifferentiated audience. That is why Sandercock consider the rationalist planning model puts scientific and technical knowledge as supreme element over other alternatives such as contextual, experiential, and intuitive.

Therefore, if rationalist model of planning is rigorously applied in the planning of ICT program, the program risk being out of touch with local realities. As a result, the program will not reflect contextual realities nor meet learners' expectation, and the result will be ineffective and efficient students' professional development. However, it is important to note that irrespective of its shortcomings this model when accompanied with other planning models and theories, fills in the gaps making it very essential and program planning in this era. Therefore, ICT program planners need to exploit means and outcome-oriented models alike to ensure that program generate the desired students' professional outcomes based on professional development. However, it is important to note that rationality model in planning is essentially for missioned planners who understand results will only be experience or felt in the long run.

4.2. Increament theory in the planning of ICT program (Charles Lindblom,1959)

Increment theory's version in planning and decision-making aspect in planning according to Akintson (2011) was introduced by Charles Lindblom in 1959 as he lamented increasingly on how the qualities of the characteristics of both public and private decision

making or planning were. Therefore, he identified with precision the origins of this incompetence from social sources. Therefore, if increment theory process is effectively applied in program planning such ICT program planning processes respecting norms, processes, taking into consideration contextual realities and constraints, it will be an effective theory in enabling students' professional development in teacher training colleges. It is for this reason that Akintson (2011) view incremenalism as a description of the manner in which planning policy is arrived at or the discussions on the most useful strategies to emback on in the planning process. he therefore, refer to incrementalism as a gradual change through a step by step process which can easily establish the crucial distinction between radical and non-radical change. On the other hand incrementalism from the perspective of educational planning can be refered to as the analytical strategies used to map out and decide how problems will be resolved.

4.2.1 The role of Increament theory in planning of ICT program

According to Degaan (2017) Lindblom (1959) presents increamentalist approaches in policy planning as well as program planning as a more efficient and effective sensibility and democracratic orientation. Therefore, Newkirk and Lederer (2006) present strategic information systems planning from at incremental perspective as a critical challenge for institutions. Newkirk and Lederer (2006) further suggested that in a context of uncertainty strategic information systems planning from at incremental perspective has proven to be more successful. Therefore, they examine these successes from the perspective dynamism (changeability and unpredictability), heterogeneity, and hostility (scarcity and competition), as they examine success in planning from the perspective of a second-order construct having to do with alignment, cooperation, analysis, and capabilities. These are elements closely related to planning norms, planning, process, planning context, and planning constraints which directly or indirectly influence students' professional development in a school setup.

According to Simom (1976) Deegan (2017) increamentalism can be seen through governments and policy makers on the norms of planning progressively improving on previous and existing policies to make them more efficient for implementation. This has been with the case in the evolution of educational policy in Cameroon. Educational policy in cameroon has experience a number of adjustment from independence to date and even with the introduction of ICTs in the 2007 in teachers training colleges, by 2013 the program had to be reviewed due to change in implementation policy. However, Cairney (2012) in Deegan (2017) holds a contrary view because he holds that policy making and planning that is done through stages irrespective of their sensibility reduce changes of producing long lasting changes because of

poor orientation and insufficient evaluation in the planning process making it non democratic. However, Deegan (2017) hold that policy makers and planners are given mandate, therefore might not have the mandate to plan and implement wide reforms.

Furthermore, Newkirk and Lederer (2006) hold that from the perspective of strategic information systems planning the Increament theory is more favourable in planning these days because of difficulties in predicting environmental or contextual changes, the diversity of context or environments, frequent scarcity of available resources, increasing degree of competition. These prevailing conditions according to Newkirk and Lederer (2006) have created limitations in planners' knowledge, reduced planning horizons, making planning precision difficult and creating reluctance in implementation planning, and creating high possibility for failure in planning product. This explains the reasons for the progressive changes in ICT program planning in Cameroon's teacher training colleges to meet up with the challenges of a fast-changing society through students' professional development.

Planning of ICT programs for TTCs in Cameroon demand a high cost and large-scale educational information systems which are as of the financial needs of the country and educational system very expensive, reason for the planners to exploit a progressive measure which is highly found in the Increament planning theory. However, Newkirk and Lederer (2006) hold that due to large-scale information system being expensive and implementation of planning being lengthy diligence is needed in planning. It is for this reason that Lindblom (1959) in Akintson (2011) emphasize strategic analysis in incrementalism that has to do with realistic policymaking strategies which are more often exploited as an alternatives. It also relate to a number of political as well as educational strategies and the intricases of producing policy agreement such as the implemntation of ICT as a subject in Cameroonian teacher training colleges.

According to Newkirk and Lederer (2006) a number of planning researchers that information system which is closely related to ICT planners should in their planning aim at responding to the moderating effects of the context, its norms and processes by exploiting the appropriate approach amongst which is the increament approach because of its flexibility, alacrity, and agility. The increament approach is more comfortable with meeting up with the ever changes times from the perspectives of norms, processes, context and takes into considerations as well as overcome constraint in planning. This is complemented by Akintson (2011) who holds that incrementalism goals and policies have to selected simultaneously, the alternatives need to be considered marginally different fromstatusquo, alternatives have to be

compared and simplified, trust should be focused experimental results than theory, repeatedly address the problem to be resolved, planners are required to restrict their attention to a number of relatively few values as well as polices, and planning behaviour should be theorized. The ICT program planning consider and exploit these princples of incrementalism.

4.2.2. Critism of Increament theory in planning

Increament theory has been criticised by a number of authors. Akintson (2011) examining incrementalism from the perspectives of simple incremental analysis and disjointed incrementalism, holds that incremental analysis has as limitation a little number of policy options which are diverge incrementally from the basic status quo. It assumes that it is more advantageous to analyse a limited number of issues comprehensively. Also, disjointed incrementalism has to do with simpfying the various srategies used in organisations. Therefore, increamental planning approaches can not solely solve existing isues. For this reason educational planners and ICT program planners in particular are advised to exploit increamental approaches along side other planning approaches to render the planning processes effective and efficient in ensuring students' profesiional development.

Also, Cairney (2012) in Deegan (2017) criticises the increamental theory and approaches for not solving problems during planning in its entirety. That is why he holds that policy making and planning that is done through stages irrespective of their sensibility reduce changes of producing long lasting changes because of poor orientation and insufficient evaluation in the planning process making it non democratic. Also, Newkirk and Lederer (2006) consider increament theories and approaches in planning not to be in exhaustive and not inclusive as it does not as it is designed to be continuous. However, in the Cameroonian setup and particularly in the educational sector the policy makers and program planners have to solve problems progressively because of the fast changing times in this era. ICT programs in teacher training colleges have to be consttanly upgraded so as to meet with the demands of the constantly evolving technological world and the society.

However, Newkirk and Lederer (2006) hold planners and system should use the most appropriate approaches in planning their new systems so as to ensure success because inappropriate approaches will only result in failure. It can be seen from related literature that incremental theory has a great role to play in the planning of ICT programs for teacher training colleges with an underlining goal of developing students' professional knowledge, abilities,

skills and aptitudes and competences. The theory relates with all the variables of the study, that is, planning norms, planning process, planning context and planning constraints.

4.3. Consensus Planning Theory (Communication)

It is a human relation theory that stipulates that planning should be participatory and involve team spirit. The theory laid emphases on group planning. Consensus theory in planning according to Briggs et al. (2005) is born of the problems institutions and organisations faces which are complex in that an individual cannot does not have the capacity to possess all the required inspiration, expertise, or resources to resolve existing problems alone. The planning of ICT program for the teacher training colleges in Cameroon cannot be done by an individual but a group of individuals, who are appointed by the minister of education, Prime minister, or the President of the Republic. Furthermore, it is for this reason that Schrage (1990) in Briggs et al. (2005) affirm that an individual effort cannot ensure collaboration in achieving set goals. Therefore, planning ICT program on the bases of respecting program planning norms, planning process, planning context, and planning constraints cannot be understood by an individual, the reason for consultations and team work to make it professional development oriented.

Therefore, Hudry and Monjardet (2010) affirm that consensus theory represents any phenomenon where several 'objects' are merged into one. This mean that the individuals involved in a planning process are obliged to come together and for a team for planning to be objective and representative. Therefore, these individuals should in their diversity be of similar or be of same field of specialty that best represent the aspiration of the policy makers. Furthermore, Hudry and Monjardet (2010) affirm that in multiple criteria decision aid and social choice theory objects preferences are expressed through a set up criteria or through voting. Therefore, Briggs et al. (2005) when it comes to planning decisions reached at the group level has an impact not only on goals achievement at the group level, but equally that individual achievements of group members which results in collective achievements.

Therefore, Briggs et al. (2005) define Consensus theory as being the degree or extent to which individuals or group of individual stakeholders are engaged to a proposal. A proposal has to do with a course that involves an action or series of actions meant for achieving the group's fixed goal and objectives. However, Briggs et al. (2005) further holds that an agreement on a team goals and objectives does not connote consensus when it comes to achieving set goals and objects. Also, they hold that decision which has to do with the act of stakeholders mutually engaging to a proposal is very much involved the consensus process of

which proposal said to be possible course of action. The planning of ICT program for teacher training colleges largely involves mutual decisions on prevailing norms, defined process, contextual realities, and consideration of existing constraints.

4.3.1 Components of Consensus theory and ICT program planning

The consensus theory as suited for ICT program planning for teacher training colleges is the consensus building model as presented by Briggs et al. (2005). This theory has to do with mechanisms of getting individuals to willingly commit to a group and its mission. The planning of ICT programs makes use of different expertise ranging from planning norms experts, planning process experts, planning context experts, and planning constraints experts. Briggs et al. (2005) the model is presented in axioms (assumptions and propositions) for clarity and brevity. There are five axioms to be examined with respect to ICT program planning:

i. Axiom one: according to lock and Latham (1990) and Pinker (1997) in Briggs et al. (2005) individual construct goals that are multiple and exclusively mutual in nature. They further define a goal as a state or outcome an individual intends to achieve. These individual goals lead to the attainment of fundamental goals which are for collective interest. Therefore, due to limitation in resources all goals cannot be achieved simultaneously. In the planning of ICT program individuals have respective roles to play with respect to existing planning norms, respecting the defined planning process, making use of contextual reality, and strategizing to overcome planning constraints collectively by each participant in the planning team achieving their own part of the goals. This is because goals are part of the planning process.

ii. Axiom 2: Briggs et al. (2005) in this model hold that human efforts are oriented towards the achievement of individual goals. Therefore, individuals accept to become part of a team by accepting to put in their efforts towards the attainment of the team's goals, because of the belief that the team's goal is instrumental in achieving salient individual goals. According to Ministry of Secondary Education (2014) the goal of planning teacher education program in Cameroon as well as ICT program is to enable the student teacher as an individual to be able to perform the professional functions of teaching, communicating, educating, analysing and regulating in his exercise of classroom and educational practices and functions. Therefore, the individual specialists that participant in the planning of ICT programs for teacher training

colleges are supposed to put in their individual efforts for this goal to be achieved through professional development.

iii. Axiom three: Mobley and Locke (1973), Lock (1970), Locke and Latham (1990) in Briggs et al. (2005) hold that there exists a subconscious mechanism in the human mind that expects in an automatic manner utility at a certain degree from achieving a goal. The engagement of different specialists in the process of ICT program planning for teacher training colleges exploit existing norms, respect the process, analyse the context, and strategize against the constraints to make the planning outcome usable and productive. That is why this work focuses on ICT program planning variables and its effect on students' professional development variables.

iv. Axiom four: Briggs et al. (2004) in Briggs et al. (2005) hold that mechanisms that are subconscious automatically assess the possibility of the goals to be attained. Given that ICT program planning process involve individual and team constraints, each member of the team has the unconsciously internally assess the possibility of realizing their individual tasks which will collectively result in achieving the general goals bestowed on the planning team. It is for this reason that Daniel Stufflebeam (1983) proposes the CIPP model which represents Context, Input, Process and Product which can be used in evaluating ICT program planning and its impact on students' professional development. It attempts to make direct evaluation of relevant needs of decision-makers during the phases and activities of a program planning and its impact on students' professional development.

v. Axiom five: This is the last but not least axiom, Briggs et al. (2004) in Briggs et al. (2005) further holds that there is mechanism in the mind that synthesis and expected outcome of planning goals with multiplication function with respect to utility and assessment or evaluation. One of the important components in ICT program planning at the level of planning norms are the goals of the educational system as well as that of the ICT program under planning, while the third and fourth element at the planning stage emphasise the monitoring and evaluation of the planning processes in relation to set goals and the planning process. The monitoring and evaluation takes into consideration that each component of the ICT program planning takes in to consideration contextual realities or variables and existing constraints with respect to the planning process and existing planning norms.

Therefore, according to the respective axioms an individual has a very important role to play in the ICT planning process because the process is done by a team made up of selected individuals with different speciality. When these individuals complete their respective individual tasks in consensus with the others, then the team task is completed which will result in a collective multiplying effect. Therefore, hierarchy of goals are necessary for the planning goals to be achieved, have high utility effect and produce higher quality, which in this case is students' professional development. It is important that the planning norms respected, the planning process exploited, the planning context knowledge exploited, and the planning constraints considered are all determine by the policy laid down by the law makers with respect to teacher training colleges. In Cameroon educational the main policy guide is law No 004/98 of 14th of Aril 1998, which laid down basis for educational orientation in Cameroon.

Furthermore, Hudry and Monjardet (2010) states that generally consensus theory represents any phenomenon where several 'objects' are merged into one. These 'objects' should be of similar or the same nature and the best representative object. In multiple criteria decision aid and social choice theory objects preferences are expressed through a set up criteria or through voting. These preferences are more often modelled through a fuzzy-binary or by-crisp relations of various kinds, which has a possibility of being represented by utility functions. In a situation where preferences are expressed through choice functions, cluster analysis is used to ensure that the objects under aggregation are classified, partition in terms of equivalence relations or hierarchies. Hudry and Monjardet (2010) further take the example of computer science where ranking can be done through web search engines; and merging objects that are symbolic is considered as an artificial intelligence topic.

It is for this reason that Horton (1966) in Hudry and Monjardet (2010) consider the consensus theory as a conceptualized scientific function which unify through shared culture, agreement on values or modes of communication, as well as political organization. This consensus model or theory focuses towards social institution maintenance based on conceptualization of the society striking a balance, structured authority, stability, order, and a moving equilibrium as well as quantitative growth. In the Cameroonian teacher training colleges' program technology comprise of two subjects; information and communication technology (ICT) and educational technology. The content of the two effective suit the consensus theory because each is representative of the other but a different focus. Therefore, Hudry and Monjardet (2010) conclude on consensus theory that it can be referred as being synonymous or in the class of structural-functionalism.

4.4. TPACK (Tecnological Pedagogical and Content Knowledge) Model

In the process of ICT program planning in teacher training colleges, there is need to take into consideration the pedagogical content knowledge with respect to the prevailing contextual conditions. According to Spector et al. (2014.), the TPACK model focuses on the connections between teachers' understanding of content to be though, pedagogy of content or discipline, and technological interaction within these three to produce effective and efficient instruction or teaching. They also hold that this model has greatly been exploited by program planners because of its influence on planning theories, educational research, practices in teacher education, and above all it has enormously influence teacher professional development. Therefore, it is very useful in the planning of ICT program in its mission to influence professional development.

Furthermore, Harris and Hofer (2011) hold that tecnological pedagogical and content Knowledge (TPACK) model is specialised and applicable content-based technology integration knowledge. Furthermore, Koehler and Mishra (2008) in Harris and Hofer (2011) affirmed that TPACK is has as characteristics cuurriculum content, diverse pedagogies, a number of technologies, and contextuality intersection of teachers' knowledge which influences learning, and they play great role in program planning as well as subsequent teacher developemnt. Aslo, TPACK is considered by Harris and Hofer (2011) as an extension of the notion of pedagogic content knowledge by Shulman's (1986, 1987) which he views as the specialised knowledge which revolutionises teachers' knouledge understanding and teachers' professional knowledge development.

4.4.1. Components of TPACK model related to ICT program Planning

TPACK model in ICT program planning makes use of four components as identified by Spector et al. (2014); pedagogic planning, subject content planning, student-teacher characteristics, and environmental context for planning application. Angeli and Valanides (2005) in Spector et al. (2014) hold that ICT related pedagogic content knowledge is made up of a series of Knowledge taken into consideration during the planning process of ICT program for teacher training colleges which a teacher must possess to be able to teach ICT as a subject. It consists of teachers' knowledge on the pedagogical processes, subject content, learners (students), the contextual realities (environmental context), above all Information and Communication Technology. This is done at the program planning level by:

i. Identifying topics enhancing ICT contents

ii. Identifying representations for transformation of content

iii. Identifying new strategies of teaching with technology

iv. Identifying ICT tools to be exploited in teaching chosen content and teaching strategies

v. Practical application of ICT activities in classrooms.

In planning ICT and educational technology programs for teacher training colleges, pedagogic content knowledge is considered content on its own and not a tool. Therefore, in this section the knowledge of ICT in educational planning, technological content knowledge ICT program planning, electronic pedagogic content knowledge in ICT program planning and Technological Pedagogical Content Knowledge-Web in ICT program.

4.4.1.1. Knowledge of ICT in education in ICT program planning

The educational planners cannot engage in the planning of an ICT program for teacher training colleges for professional development without taking into consideration of the knowledge of Educational Technology. Margerum-Lays and Marx (2003) in Spector et al. (2014) views Knowledge of Educational Technology as the teachers' comprehension of educational technology exploiting the orientation of Shulman (1986) that conceptualized teacher knowledge into content knowledge, pedagogical knowledge, and content knowledge.

Also, knowledge of educational technology has to with the integrated comprehension of teaching technology and teaching with technology which is reinforce by TRACK model emphasizing on the consideration of the interactivity between content, pedagogy and technology in the planning of programs Spector et al. (2014). Therefore, in the planning of ICT program for teacher training colleges these elements are supposed to be taken into consideration to ensure the development of knowledge, skills, and competencies for effective professional development.

4.4.1.2. Technological content knowledge of ICT program planning

ICT program planning for teacher training colleges demands a lot of emphasis on technological content knowledge of ICT program content. ICT is a technological subject therefore its content must content technological knowledge and skills to be acquired. For this reason, Slough and Connell (2006) in Spector et al. (2014) affirm that planning has to take into consideration the totality of intersection of content and technology. Therefore, technology should be part of the content in ICT program so as to make it more practicable. It is for this reason that in the 2013 program for TTCs the program planners examined the context and came

up with the educational technology to reinforce the technological or practical part of ICT (MINESEC, 2013).

Furthermore, Slough and Connell (2006) exploit the analogy of lenses through which they view the planning of content and technology which are components that are manifested through the practicality of the instruction and the learning process. Planning of program with respect to content and technology can therefore be said to a collaborative professional process of professional development and is also an approach focused the final product of planning which is teaching and learning. According to Slough and Connell (2006) visualizations generated by computer is an example of the result of program planning in which content and technology offer opportunities for scientific understanding. When this is done with contextual realities being taken in to consideration, then professional development can be said to be very visible. According TPACK technology has to be the realm of knowledge.

4.4.1.3. Electronic pedagogic content knowledge in ICT program planning

ICT deals mainly with electronic resources and devices, therefore in the planning of ICT program for teacher training colleges electronic content has to be included to ensure adaptability of the program to the time and context. Franklin (2004) and Irving (2006) in Spector et al. (2014) affirm that electronic Pedagogical Content Knowledge Electronic has to do with knowledge obliged for teachers' possession in the process of executing the integration of technology in to classroom activities as planned in the program planning process. That is why the ministries of basic and secondary education are in planning their respective ICT programs considered electronic content which will particularly aid teachers and students in e-learning and distance learning.

Furthermore, electronic knowledge exists side by side content, pedagogy, and curriculum knowledge (Spector et al., 2014). Furthermore, Dawson (1998) and Becker (2000) in Spector et al. (2014) focusing on the issue of electronic knowledge in planning states that electronic knowledge is distinctively not the same as other basic technical knowledge in that it creates a connection between efficacy and technology integration. Therefore, the ICT program planning for teacher training colleges has to take into consideration the curriculum implementation stage by planning technological integration methods and strategies that emphasizes on the maximization of students' learning.

4.4.1.4. Technological Pedagogical Content Knowledge-Web in ICT program

In planning ICT program for teacher training colleges, a mastery of the TPACT components is very important for subsequent implementation of the program planning. According to Spector et al. (2014) TPACT models' components are interwoven creating a web. Here the focus is on the general web components with respect to knowledge on their uses and exploitation of specific tools in the web. This web can be exploited in ICT policy planning to select desirable and proper content and pedagogy which will facilitate the classroom teaching and learning processes (program implementation) and will give rise to diverse approaches to insert different kinds of technological content and skills (Spector et al., 2014). That is why Harris and Hofer (2011) holds that instructional planning ends up being activity based and content focus which result in students' professional development.

4.5. Competence development theory: Albert bandura's professional development perspective of social learning theory

Borko (2004) in Watson (2013) affirms that Bandura's theory of social learning is closely related to professional development because it focuses on cognitive and social learning variables. Also, Watson (2013) cognitive perspective draws attention to the concept that this greatly influences mutations in students and teachers' knowledge and beliefs. Furthermore, the social perspective of the theory takes into consideration students and teachers' participation as elementary variables in professional studies which result in professional development (Lave and Wenger, 1991 in Watson, 2013). The Social Learning Theory by Bandura (1977) according to Watson (2013) has provided data on the theoretical method of integrating cognitive and social variables in the learning process. Therefore, the Social Learning Theory examine as a main sub-construct self-efficiency, which is highly exploited in professional education. Therefore, ICT program planning result in a cognitive and social self-efficiency which is projected through students' professional development.

4.5.1. Social learning Theory Principles

According to Bandura (1971) Social Context learning is the focus of social learning theory. Bandura established the mutual learning components of human being by analysing the concepts of learning through observing others, imitating their behaviour, and modelling after admired behaviour. Therefore, human beings learn by observing others behaviours (comportment) and the effects or consequences of this behaviour. This will determine if they will change their behaviour or not. Planning of ICT program is done to bring about change of

behaviour in students that will have as effect students' professional development. Therefore, the social learning theory is built on the following principles:

i. Human beings have the potential of learning through observation others behaviours and analysing its consequences;

ii. For learning to take place there must not necessarily be a change in behaviour because it occurs through observation;

iii. Behaviour change must not be considered as an obligatory element of manifesting learning, because cognition has a great role to play in learning;

iv. Behaviour is affected or influenced by possibility future punishments or reinforcements awareness and expectations; social learning theory acts as bridge between behaviourists and cognitivists concepts of learning;

v. Bandura (1971) holds that environmental modelling reinforcement and punishment occurs when human beings desire to model others behaviours is reinforced. This makes environment a great modelling factor.

Therefore, these principles can summarise in observation, imitation and modelling as main concepts (Nabavi, 2012). Social theory of learning takes can be interpreted to development principles which are instrumental in ICT policy planning in its goal to ensure students' professional development. Also, planning students' professional development elements in ICT program planning process makes use of social learning theory. These principles are: interaction between hereditary and environment result in development; development is a systematic process; development occurs in critical turns; because development is predictable, it occurs in a predictable holistic line; development occurs holistically, from one developmental zone to the other facilitated by interaction; development is unique due to human differences; and due to factors link to environment and learning experiences, development has critical moments (Akdeniz et al., 2016).

4.5.2. Social learning theory and professional development in educational context

Professional development in educational context comes from the interaction between teachers and students. In the teacher training college, this interaction is designed with specificities to enhance the construction of knowledge, development of learning behaviour and skills, the reinforcement of attitudes and competences (MINESEC, 2013). The objective behind this is to facilitate changes in classroom attitudes, beliefs, practices, and learning outcome of

students. According to Guskey (2000; 2002) in Heijne-Penning et al. (2018) the motivating factor that stimulate teacher's involvement in professional development and pedagogic processes that result in effective change in a teacher, are the main factors that determine practices that influence professional development. Therefore, in planning ICT program for teacher professional development, these two factors have to be greatly considered and put in place. That is why the 2013 ICT program for TTCs was based on the Competency Based Approach.

Furthermore, according to Nabavi (2012) the theory of social learning contains to elements of motivation, attention and memory. It is for this reason that Bandura argues that there exist a possibility and potential for human beings to learn by observing others, and the learning can occur for both behaviour and information. Given the fact that human beings do not only learn new behaviour but also new information, the underlining principles of social learning theory holds that learning must not result in an observable behaviour. There are cognitive skills that cannot be physically observed but are very instrumental in professional development. This is in contrast to behaviourist stands because behaviourists do hold that for learning to occur, there must be relative change in observable behaviour.

Bandura (1971) discussed a number of behaviour modelling reinforcement modes:

i. The observer is reinforced by the model;

ii. The observer is reinforced by the different persons;

iii. When a desired behaviour copied (imitated) it results in reinforcing consequences;

iv. The consequences of the model's behaviour vigorously influence the observer through vicarious reinforcement.

Modelling has components that influences teachers and students and can be associated with professional development in ICT program planning. There are; praises reinforce positive professional behavioural improvements, good professional knowledge, abilities and skills (behaviour) have rewarding consequences when imitated, and the nature of knowledge, ability and skills imitated by a student is dependent the observed impact of the knowledge, ability, or skill on the model. Therefore, ICT program planning for teacher training colleges for professional development has to take into consideration the knowledge, abilities, and skills possessed by teachers as models; and which if imitated by the student teachers will reinforce professional development in the teacher training colleges.

Also, Lortie (2002) in Watson (2013) consider learning via observation as a great strategic instrument in the process of teacher professional development. This can be explained by the fact that teachers are human developers and the means they choose to ensure the development of desired behaviour (knowledge, abilities, aptitudes, and competences) in the course of a program or an activity has to be related to the contextual realities, professional knowledge, abilities and skills, aptitudes and competences require for the practice and students' success in future career. Also, Bandura (1977) in Watson (2013) examine observation as the key learning and knowledge, ability, skill, aptitude, and competency building mechanism. That is why Watson (2013) continues by affirming that mental modelling type which has as product the development of new sophisticated behaviour is presented in the social learning theory.

This can be explained by the fact that behaviours are not often automatically imitated but first of all go through the phase of observation, and then restructuring for circumstantial purposes. Therefore, the ICT program for teacher training colleges for students' professional development purposes should be oriented towards making teacher trainers and student teachers to develop observation skills so as to introduce innovations and inventions that will reinforce professional development in their respective institutions rather than just copy and do things the traditional way. One of the greatest indicators of professional development in today's educational establishments is spirit of innovation and creativity. That is, to be able to exploit observation and come up with more improved ideas, tools, equipment, methods and why not new ones.

According to Bandura (1971) reinforcement expectations promote cognitive learning processes through its influence of awards or suspension influence learning promotion cognitive processes. As a result, components like attention are critical when learning is concerned because it influences reinforcement expectations. In the planning of ICT program for teachers training colleges the elements of arousing and maintaining attention are incorporated to ensure quality professional development. It is for this reason that social learning theory is considered as a contemporary era theory with respect to the role of ICT program planning in students' professional development. This is seen from its elements of positive and negation reinforcements (reward and punishment) which in return refocus learning. ICT program planning makes provision for content and tools that motivate learning. In fact, positive or negative reinforcements considered during ICT program planning greatly determine the extent to which a teachers and student exhibit the expected acquired behaviours (knowledge, abilities and skills, aptitudes and competencies). In addition, ICT in Education enables students

to take more active role in learning rather than being a passive observer. ICT is much more practical than theoretical.

4.5.3 Educational Policy Theory.

A system as described by Daft, Kendrick & Vershinina (2010) comprises of different closely related parts that function together to achieve a common goal. A system operates through using input from external environment and giving back some output to the external environment (Daft, Kendrick & Vershinina, 2010). System theory can be viewed as having five components that interact with one another; inputs, processes, outputs, outcomes or feedback and the environment. The system theory is one of the modern management theories to study the relationship between organization and its environment. System theory was developed in the 1950s and 1960s and attempted to explain and predict the behavior of the entire organization which includes people, structure, environment and technology (Asemah, 2010). Concepts of the general systems theory underlie the development of information systems. Khazanchi and Munkvold (2000) defined a system as "a collection of interrelated components that work together for a common purpose" which occurs with the systems theory.

System Theory can effectively explain the functioning of an Educational Policy. The theory believes that the whole is greater than the sum of its parts. This theory considers all elements in the whole organizations as well as its component parts. The theories view organization as an adaptive system, which must adjust to changes in its environment if it is to survive. The systems theory rests on the belief that in systems, all the parts perform different functions but their interactions are dependent on each other. It describes a system as a series of interrelated and interdependent parts, such that the interaction of any part (sub-system) affects the whole system. A system consists of three basic activities –input, processing and output- that transform raw data into useful information. Feedback is output that is fed back to appropriate people or activities.

Policies are officially written document with applicability and scope statement that is indicating effective dates and responsibilities which could be found as laws, texts, decrees, ministerial decisions, presidential decrees, school rules and regulatory circulars. Educational Policy refers to educational plan, principles, course of action, guidelines, a statement of ideas and principles conducted by a given country for the growth and development of the educational sector. There can emanate from International organizations such UNESCO, parliamentary or legislative texts as well as regulatory texts.

There is a systematic procedure required to arrive at an Educational Policy-people, structure, environment and technology (Asemah,2010) parts are interrelated and depended on each other. The people involve in formulating a policy, include policy makers at the strategic level, policy interpreters like the inspectors at the tactical level and policy implementers(teachers) at the operational level. The most sophisticated as well as the layman ideas and knowledge about the society are required in the placement of an educational policy. Knowledge of what education should serve at as well as knowledge of available manpower, student characteristics and population, form the basis of a sound Educational Policy.

After considering all the conditions above in a step by step approach starting with the layman ideas in the field where teachers, students, and other stakeholders' ideas and opinion are consulted. The process continues until the parliament deliberate and adopt then finally the head of state enacts.

In order to come out with an ICT policy or ICT program, there is need to work with a network of different individuals, resources, policies etc. The teacher training college must work as a harmonized system so that the application of ICT in teacher training college should be successful. Planning at macro (national), tactical (regional offices) and micro (operational) should work hand in gloves to ensure success. This means that the state, the divisional delegation and the teachers in the field should work in collaboration.

4.6. VARIABLES OF THE STUDY

The variables of this study are group in to two, the independent variables and the dependent variables.

4.6.1. Independent variables

An independent variable is a factor that causes a phenomenon. The independent main independent variable in this study is ICT program planning, with the following sub variables:

- planning norms, Planning process(steps), Planning context(situation)
- Constraint (challenges)

4.6.2. Dependent variable

A dependent variable has to do with features that are derived from the hypothesis statement. The main dependent variable in this study is students' competence development. in this study, competence development has the following indicators:

1. Knowledge
2. Skills
3. Ability
4. Competence

Table 14: A synoptic table showing the variables of the study

Educational planning of ICT program and its effect on students' Competence Development: The case of selected Teacher Training Colleges in Cameroon.

SPECIFIC RESEARCH QUESTIONS	RESEARCH HYPOTHESES	INDEPENDENT VARIABLES	INDICATORS	MODALITIES	DEPENDENT VARIABLE	INDICATORS	MODALITIES	MEASURING SCALE	STATISTICAL TECH-NIQUE
To what extent does ICT program planning norms affects students' professional development in teacher training colleges	ICT program planning norms significantly affects students' professional development in TTC,s	- planning norms	-National instruments (law, decree, decisions, orders, service notes, strategic papers) -Goals -assessment methods -external instruments	Agree Strongly Agree Disagree Strongly Disagree	Students' professional development	- Knowledge - Skills - Ability - Competence	Agree Strongly Agree Disagree Strongly Disagree	Interval scale	r(Correlation) Pearson Correlation
Does ICT program planning process affect students' professional development in teacher training colleges	ICT program planning process significantly influence students professional development in TTC,s	-Planning process(steps)	- diagnosis -implementation -monitoring -evaluation	Agree Strongly Agree Disagree Strongly Disagree	Students' professional development	- Knowledge - Skills - Ability - Competence	Agree Strongly Agree Disagree Strongly Disagree	Interval scale	r(Correlation) Pearson Correlation
To what extent does ICT programs planning context affects students' professional development in teacher training colleges	ICT programs planning context significantly affects students professional development in TTCs	-planning context(situation)	-Financial issues -Socio-political issues -health issues -resources	Agree Strongly Agree Disagree Strongly Disagree	Students' professional development	- Knowledge - Skills - Ability - Competence	Agree Strongly Agree Disagree Strongly Disagree	Interval scale	r(Correlation) Pearson Correlation
Does ICT program planning constraint affects students in professional development teacher training colleges	ICT program planning constrains significantly influence students professional development in TTCs	-Constraint (challenges)	- Context (environment (urban and rural)) -organisation - strategies -technology	Agree Strongly Agree Disagree Strongly Disagree	Students' professional development	- Knowledge - Skills - Ability - Competence	Agree Strongly Agree Disagree Strongly Disagree	Interval scale	r(Correlation) Pearson Correlation

Source: Researcher Computation (2019)

6.7.0. CONCLUSION

In this chapter two (2) the focus was laid on the conceptual, empirical and theoretical frameworks. These aspects were discussed according to the variables of the ICT program planning and competence development.

CHAPTER THREE
RESEARCH METHODOLOGY

5.0. INTRODUCTION

This chapter describes the method and instruments used to collect data for the study. It presents the research design, the area of the study, population of the study, sample and sampling procedure, instrument for data collection, validation of research instruments, data collection and method of data analysis, ethical consideration, and plan of research activities.

5.1. RESEARCH DESIGN

The descriptive Survey research design will be adopted for this study that studies the effect of planning ICT program on student teachers' competence development. As generally conceived, survey research is one in which a group of people or items is studied by collecting and analysing data from only a few people or items considered to be representatives of the entire group. The descriptive survey research design is preferred in this study because the study was pre-planned, organized and conducted in a setting that required direct responses from selected sample of respondents while investigating an existing phenomenon in order to describe its characteristics without manipulating the variables. For descriptive research, Karasar (1999) expresses as an explanation of an existing situation to give just a picture and Gay (1976) defines descriptive research as "collecting data in order to test hypothesis or answer questions concerning the current status of the subject of the study"

In this study, the mixed method research paradigms were implemented concurrently to collect data (Creswell, 2003; Creswell, 2014). Simultaneously, two phases explain how a convergent parallel mixed methods strategy occurs according to Creswell (2014)**.** As such, the qualitative data is used to support the quantitative data (Creswell, 2003 Creswell, 2014). The qualitative and quantitative data were then synthesised in the data analysis stage. This method is called triangulation. Gay (1996:217) defines triangulation as "the term for the use of multiple methods, data collection strategies and or data sources". The decision to combine quantitative and qualitative methods in this study is justified on the grounds that it will made it possible for us to explore the research questions from different perspectives which would lead to broader understanding of the issues. The mixed method design was used to identify if a gap exists between planning ICT program in Teacher Training Colleges and student teachers' competence development.

5.2. AREA OF STUDY

This refers to the geographical location where this study was affected and it took place in Cameroon. Cameroon, located in Central Africa, has a surface area of 475,440 square kilometres and has an ethnically and linguistically diverse population of about 20 million with about 200 linguistic and ethnic groups according to the Cameroon/World Bank Report (2020). Cameroon is bounded to the south by Equatorial Guinea, Gabon and Congo; the Atlantic Ocean on the south-west, to the west by Nigeria; on the eastern side by Central African Republic and Chad; and to the north by Lake Chad. Cameroon has two official languages, English and French adopted from its colonial heritage. Cameroon has ten regions: Centre Region, South-West Region, North-West Region, West Region, Littoral Region, South Region, East Region, Adamawa Region, Far North Region and North Region with each region further sub divided into Divisions and Sub-Divisions. Each Region is governed by an appointed Governor to whom the Divisional and Sub-divisional officers are answerable.

Specifically, this study was conducted in Government Teacher Training Colleges for the training of Basic Education teachers. Cameroon has 72 Government Teacher Training Colleges in the ten Regions that trains teachers of basic education located in each Divisional headquarters with few Divisions having two teacher training colleges. Student teachers enter through competitive entrance examination with a minimum qualification of passes in Ordinary and Advanced Level General Certificate of Education Examinations. These examinations are runned by the Department of Exams under the department in charge of teacher training in the Ministry of Secondary Education. The number of students per school each year is set by a Ministerial decision with the usually limited number of places based on the availability of human and material resources projected in each school as seen in table below. Student teachers spend either one, two or three years in training based on their entry qualifications.

The Structure of GTTCs of the two Subsystems

The fact that this researcher is a Cameroonian justified this study area that it is aimed at contributing to knowledge in the Country. Also, the great need to advance ICT reforms in Cameroon to train primary school teachers with 21st century skills and Government's relentless efforts in this direction in spite of the challenges necessitated this study area. This is because the researcher has been teaching primary school teachers for 15 years, most especially has been teaching ICTs and Didactics of Educational Technologies for 8 years and therefore sees the need to find out how the ICTs program affect professional development of student teachers.

Furthermore, as a teacher trainer, doing research on primary teacher education in Cameroon gives this researcher an opportunity to contribute in this domain of education in a country whose terrain she masters. The center region whose capital is Yaounde was highly considered in this study. This region has ten divisions namely: - Mfoundi, Lekie, Haute, Sanaga, Nyong et Mfoumou, Nyong et Akono, Mbam et Inoubou, Mbam et Kim, Nyong et Kelle.

The West region (French: Region de l'Ouest) is one of the ten regions of Cameroon which also constitute area of study of this work. It is a territory of 14,000km2, a population of over 1982100 inhabitants with a density of 142, 9 h/km2 located in the central-western portion of the Republic of Cameroon. It borders the North West Region to the North West, the Adamawa Region to the North East, and the Centre Region to the south East, Littoral to the Southwest and South west region to the west. The west mountainous terrain and active tectonics create many fast-moving rivers with picturesque falls and isolated crater lakes. The soil varies greatly within a relatively small land area. The Mbam River runs along the border with the Center Region. The Nkam is the name for the headwaters of the Wouri River. The land along the Noun River and at the Bamendjong reservoir, for example, is a lightly evolved blend of various raw materials. The regions western half, on the other hand, is a haphazard mixture of raw minerals, granite, ferrallitic patches of red dirt, and other types.

The west region is one of Cameron's more pleasant climates. Temperatures average a cool 22, and rainfall is moderate. Rainfall, moderated by the mountains, averages 1,000-2,000 mm per year through out. It is the smallest of Cameroons ten regions in area, yet it has the highest population density. The west population density is high in general, especially in the towns of Bafoussam, Dchang, Mbouda and Bafang. This is due to pleasant climate and fertile soils.

The west is one of Cameroons soundest economic areas due primarily to its agricultural prosperity and enterprising traditions of the Bamileke people. It is home to relatively little industry. The areas few factories are almost all devoted to food processing, with plants in Bafoussam (beer, instant coffee), Foumbot, Dchang, and Ke'kem. They are also involved in businesses in building materials, pharmaceuticals, etc.

As home to enterprising Bamileke tribes, the west is an economic bright spot and one of Cameroons more developed regions. This progressive development is tempered by the strong traditional cultures that persist among major Bamileke and Bamum ethnic groups. Thus, two major tribal groups dominate the West, both of which are considered Semi-Bantu or grass fields

Bantu. The Bamileke are more numerous, estimated to 3,000,000 or more. Bafoussam, otherwise known as feutsap is the town of this Bamileke tribe of Cameroon. It is the capital or headquarter or the chief town of the west region of Cameroon with 40 sub divisions under eight (08).

The researcher also worked in the South West Region of Cameroon. Prominent amongst the highlands in Cameroon is Mount Cameroon which rises to a height of 4070 meters and found in the south west region of Cameroon -Buea. It is the highest mountain in the West central African region (Tambo, 2003). It has two main plantation farming companies: - Cameroon development cooperation (CDC) which specializes in the production of oil and PAMOL. This region, in socio-cultural terms is inhabited by a variety of people including foreigners with different cultural and linguistic traits. The languages, of which more than 25 were identified, have as the most spoken are English, French and Bakweri. Pidgin English is used as a lingua franca for business and social purposes. The people practice several economic activities such as agriculture, fishing, lumbering and hunting it harbors the University of Buea, one of the most renounced Anglo-Saxon University in Central Africa which has thousands of students across the country. This region has several English-speaking schools: - primary, secondary, teacher training institutions and teacher training and professional schools. There are six divisions with every one having a divisional delegate.

North West region was also considered. She is bounded on the North by Adamawa Region and Nigeria on the left, East by West region and on the South by the South West region. It has seven divisions and thirty-four sub divisions. It has many relief features like the Bamboutos and mount Mount Oku, Lake Awing, Oku and Nyos, Ndop and Mbaw plains and Menchum/Abi falls. The North West region has dry and rainy season. The vegetation of the Region is largely grassland even though some areas have patches of forest. As far as economic activity is concerned, this region practices agriculture to a large extent. The people grow food crops and cash crops like Irish potatoes, beans, Arabic coffee oil palms and supply food to mostbig towns like Douala and Yaoundé. It harbors many professional and educational institutions like the University of Bamenda found in Bambili. The Region is also noted to have many primary, secondary, teachers training colleges. Some of the prominent tribes in North West Region are Widikum, Moghama, Ngie, Oshie, Oku, Mankon, Bali, Bafut and Nso.

5.3. POPULATION OF THE STUDY

According to Amin (2005:6) population is defined as "the complete collection (or universe) of all the elements (units) that are of interest in a particular investigation" This refers to the universe to which the findings of this study shall be applicable or generalised. A population can be classified into two- target and accessible. The target population is all the members of the specified group to which the investigation relates while the accessible population is defined in terms of those elements in the group within the reach of the researcher. The population of this study shall comprise all the teacher trainers and inspectors in charge of ICTs of the 72 public teacher training colleges in Cameroon.

5.3.1. The Target population

Amin (2004) defines a target population as the population to which the researcher ultimately wants to generalize the results. It could also be said that target population is all the members of the specified group to which the investigation relates. The target population was made up of all the teachers and inspectors in charge of ICTs in the Government Teacher Training institutions in Cameroon as seen in table 15 below. Teacher Trainers were chosen because they are the implementers of the ICT program. All the teachers were involved because in Teacher Training Colleges generally any teacher can be sent to teach any subject including ICTs since they are considered professionals. In addition, the researcher assumed that they were the best group that could generate accurate data needed for the study.

Table 15: Summary Table of Target Population According to Regions of Cameroon

Regions	**Adamaoua**	**Centre**	**East**	**Far North**	**Littoral**	**North**	**North West**	**West**	**South**	**South West**	**National Total**
G.T.T.C (Student teachers)	650	1046	445	2530	775	1203	611	1119	358	570	9307
Teacher Trainers	116	646	71	270	220	198	292	277	148	371	2685

Source: Ministry of Secondary Education Statistics department (2020)

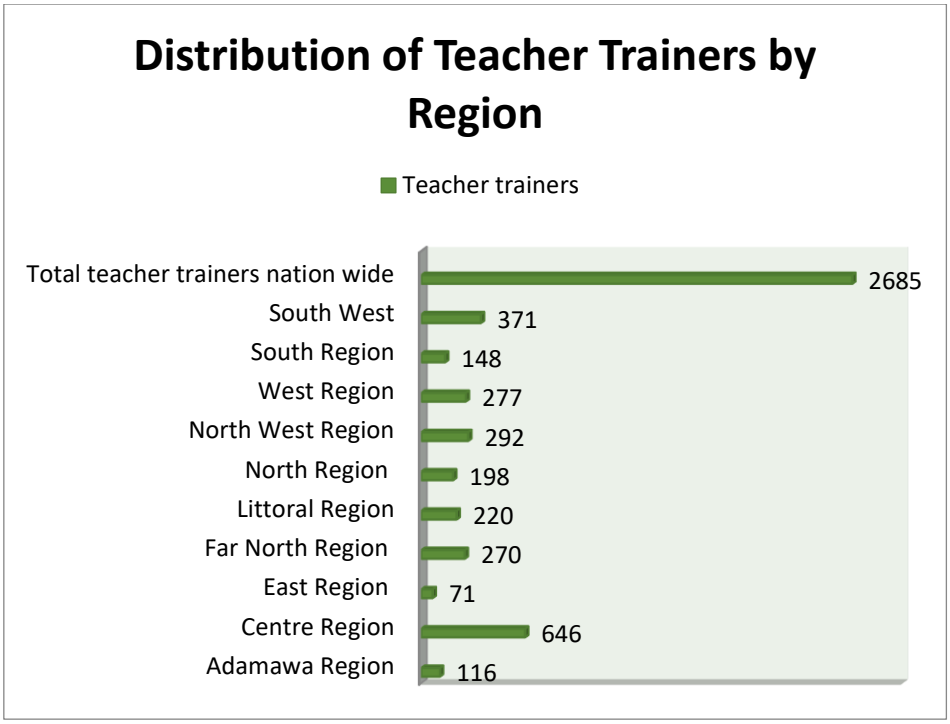


Figure 08: Distribution of teacher trainers by region

The histogram on figure 07 above shows that out of the total teacher trainers (2685) in the year 2020, the Centre region has the highest with 646 teacher trainers while the East region has the least with only 71 teacher trainers. The Adamawa region has 116, the Far North region has 270, the Littoral region has 220, the North region has 292, the North West Region 292, the West region 277, South region 148, and South West has 371 teacher trainers.

5.3.2. The Accessible population

This is the population from which the sample will actually be drawn (Amin, 2004:6). The accessible population was comprised of teacher trainers from five regions out of ten regions in Cameroon. These include the South West Region 371, North West Region 292, West Region 277, Far North Region 270, and the Centre Region 646. This is best illustrated by table 16 and figure 08 below.

Table 16: Summary Table of Accessible Population

	Centre Region	North West Region	South West Region	West Region	Far North Region	TOTAL
Teacher Trainers	646	292	371	270	277	1856
Inspectors of Teacher Trainers	02	02	02	02	02	10

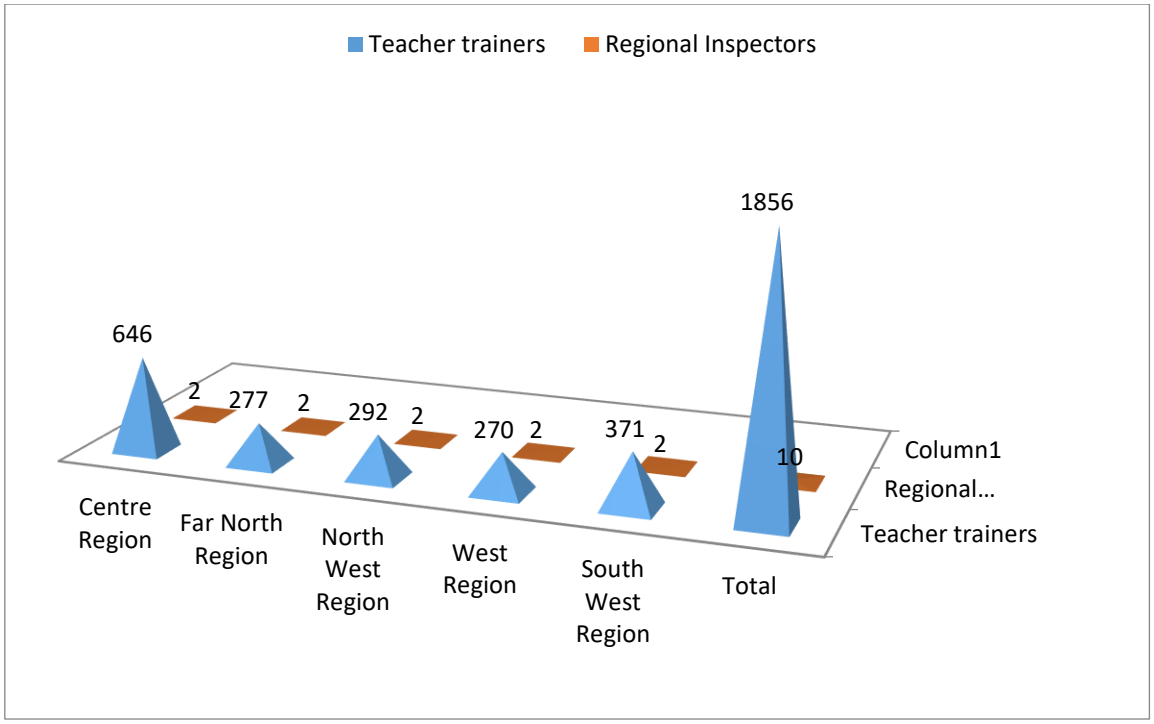


Figure 09: The Accessible population of the study

5.4. SAMPLE AND SAMPLING TECHNIQUE

A sample is a smaller group of elements drawn through a definite procedure from a specified population. Drawing inference or generalization about the population based on the data obtain from the sample is of primary concern in any scientific investigation (Nzorgu,2015).

Many sampling techniques were employed to obtain a representative sample for this study. Purposive sampling was used to select the target population which involves all the Teacher Training Colleges in the ten regions of Cameroon. In addition, in order to get five regions from the ten regions a purposive sampling was used. The five regions were deliberately chosen because the researcher realised, she could easily collect data from them. Some regions were far and had a lot of challenges going there but the researcher took the pains to go there because it was worthwhile to have varieties of regions to work with. Taking the pains to work with five regions gives the work scientific maturity.

There is one Bilingual Teacher Training College found in each regional headquarters and so the researcher purposely chooses the five main Bilingual Teacher Training Colleges. The main Bilingual Teacher Training Colleges are considered reference centres in terms of teachers, facilities etc and the researcher did not hesitate to use them. Simple random sampling was also used to select two cities each from the five regions. The researcher wrote the names of the different colleges in each region on slips of paper. On two of such slips were written

"Yes" and the rest "NO" The slips were then folded and put in a basket. The total of Teacher Training Colleges in each region were considered and the number written on slips of papers. Each slip of paper represented a particular Teacher Training college and the number of slips represented the total number of colleges in the region. The folded slips in the basket were thoroughly shuffled. A child was called to pick from the basket after shuffling, each slip was blindly drawn. Each drawn slip was unfolded and the selected region.

This procedure was repeated until the desired number of regions and institutions was selected. The procedure therefore gave each region and college equal chance of being chosen. At the end five (5) regions of the study were chosen from which fifteen (15) Government Teacher Training Colleges were gotten from 72 Teacher Training Colleges (TTCS). After selecting the schools with their corresponding levels, the number of teacher trainers, inspectors to be selected from each regional delegation to make up the desired sample size was calculated. The sample size was determined using Krejcie and Morgan's table on "determining sample size for research activities" (Krejcie and Morgan, 1970). This number was in accordance to the total number of teachers in each school selected.

The researcher employed the procedure described above in smaller classes (using simple random sampling) and systematic random sampling was used to obtain 417 teacher trainers respondents from larger classes visited. In total 417 teacher trainers for the quantitative study and regional 10 inspectors for the qualitative study were obtained. This is shown in the table below. Meanwhile the researcher employed the procedure using simple random sampling, and calculated the sample using an online sample size calculator. Therefore, sample population was calculated as follows;

$$\text{Sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

N = population size • e = Margin of error (percentage in decimal form)
z = z-score

www.surveymonkey.com, was the online calculator exploited in calculating the sample size of this study. The online calculator was used by the researcher to calculate the sample size from 1856 teacher trainers, at a confidence level of (95%) and a 4% error margin. This resulted to a

417 Sample size. It is important to declare here that the sample (10) of the interview was not drawn from this sample population as will be noticed in the table 17 below.

Table 17: Summary Table of Sample Population according to Region

REGION	SCHOOL	POPULATION (N) TEACHERS			SAMPLE		
		N	Female	Male	Female	Male	Total
CENTRE	GBTTC Yaounde	78	72	06	34	06	40
	GTTC Mbalmayo	71	71	-	42	-	42
	GTTC Mfou	91	91	-	43	-	43
SOUTH WEST	GBTTC Kumba	42	31	11	18	08	26
	GTTC Buea	100	92	08	36	04	40
	GTTC Bangem	16	13	03	13	03	16
FAR NORTH	GBTTC Maroua	56	33	23	15	10	25
	GTTC Kousseri	27	03	24	03	15	18
	GTTC Mokolo	39	09	30	07	20	27
NORTH WEST	GBTTC Bamenda	83	67	16	35	11	46
	GTTC Fundong	16	08	08	08	08	16
	GTTC Kumbo	21	13	08	08	05	13
WEST	GBTTC Bafoussam	46	34	12	22	08	30
	GTTC Dschang	32	20	12	13	07	20
	GTTC Mbouda	22	13	09	09	06	15
TOTAL	**15**	**1865**	**1195**	**170**	**306**	**111**	**417**

Field work 2019/2020

5.5. INSTRUMENTS FOR DATA COLLECTION

In order to find out answers to the questions of the research, the researcher used a questionnaire and an interview as data collection techniques. The use of quantitative and qualitative approaches of this magnitude was due to the fact that the study was a mixed method research and thus necessitated the use of qualitative and quantitative data. All research instruments were translated into English and French and then the other way round to ensure accuracy of the items. Effective revision was carried out on all research instruments to eliminate problems in language comprehension and translation.

5.5.1. Questionnaire

Two kinds of questionnaire exist: - structured or fixed response questionnaire and the unstructured or open-end questionnaire but this work focused both on structured and unstructured items. In this type of questionnaire, the respondents are not only restricted to some response options but can still supply answers to varied questions posed. For the structured or fixed response questionnaire a number of response options are supplied and the respondent is expected to pick any one that best suits his response (Nworgu,2015). Teacher trainers' questionnaire was the main research instruments that were carefully prepared with respect to the objectives studied, following the likert scale and was administered to teacher trainers in their selected schools.

These questionnaires were made of two main parts which was further broken down to five (5) sections (section A, B, C, D, and E) designed to evaluate different parts of the 2013 ICT based teacher training program in Cameroon. Part one (1) basically presented biographical and demographic information (school type, name of school, region, gender, age, ICT resources, qualifications, experience, frequency of teaching ICT and DET, resources available for teaching, training received by the teachers before and after effective teaching. This first part had twelve (12) questions that were answered differently.

The second part, part two was carried out in five sections which covered different parts of the 2013 ICT based teacher training program. Each section had five (5) questions which measured the ICT program planning of the 2013 ICT based teacher training program. Each of these sections had one question which posed as a distractor. Four point – Likert scale questions consisting of Strongly Agree (SA), Agree (A), Neutral (N), Disagree and Strongly Disagree guided sections A, B, C, D, and E with grades ranging from 1 to 4. Participants were required to respond by placing a bold tick (√) on the appropriate column that best suits their opinions.

Aspects of the planning norms were posed in this section with regard to national instruments, goals, assessment methods, and international instruments of ICT program and students' professional development variables in teacher training colleges. Section B involved planning process of ICT program from the perspective of diagnosis, implementation, monitoring and evaluation of ICT program in relation to students' professional development variables in teacher training colleges. Section C involved planning context of ICT program from the perspective of financial issues, Socio-political issues, health issues, and resources of ICT program planning in relation to students' professional development variables in teacher

training colleges. Section D involved planning constraints of ICT program from the perspective of the environment (urban), organisation, strategies, and technology of ICT program planning in relation to students' professional development variables in teacher training colleges. And the last section which was E, students' professional development variables of knowledge construction, skills development, academic performance, and competencies in relation to ICT program planning variables in teacher training colleges.

5.5.2. Interview guide

The researcher used a structured interview to collect quality data based on "Educational policy planning of ICT program and its effects on students' competence development in selected Teacher Training Colleges in Cameroon". Here ten (10) inspectors were selected for the interview. The ten (10) were chosen from different Delegations and Inspectorates in charge of Information and Communication Technologies (ICTs) with the researcher being the moderator. The interview guide was drafted by the researcher and sent to the whatsApps inboxes of the different participants. The participants equally answered by expressing their views in relation to the subject under study.

The interview guide required more than a straight forward response unlike the questionnaire, for inspectors to respond by expressing their views. Thus, it was demanding and lengthy. The interview was carried out as such; the researcher constructed 20 questions (items) which were divided into 5 main sections based on the main variables of the study. She worked with the participants of GBTTC Garoua, GBTTC Buea, and GBTTC Bamenda for one month. Three types of research authorisations were used by the participants to collect information: - the one from the Minister of Secondary Education, the University and the one from the Commissioner of police. The first week, she inboxed the participants the first 5 questions (items) based on some main variables of the study. Since interview required lengthy writing and expressions; the participants used the whole week in responding to the above questions. Their responses were sent directly to the inbox of the researcher and came in, through the following ways: voice mails, text, video and audio call through whatsApp. The following week, the researcher equally sent the next five set of questions (items) on the structure interview guide based on the variables of the first research question through the whatsApp inboxes of the participants. The participants did same by sending their responses through text messages, video and audio calls through WhatApp. The same procedure was repeated for the third, fourth and fifth week based on the different variables of the second, third and fourth research questions respectively. At the end of the fifth weeks, the findings were analysed according to the different

research questions. These techniques enabled the researcher to gather an indebt knowledge on the subject under study due to the fact that participants' feelings, attitude, and opinions could be seen and judged and this was relevant for the study.

5.6. VALIDATION OF RESEARCH INSTRUMENTS

According to Mbua (2003) validity has to do with the accuracy with which an instrument like questionnaire or interview guide measures what it is designed to measure. Furthermore, Amin (2005) states that validity has to do with the ability to produce those findings that are in agreement with a selected theoretical and conceptual values, by producing accurate results and measuring what it is designed to measure. The supervisors of the research examined the questionnaire and the interview guide. After which the instruments (questionnaire and interview guide) were examined and validated by three (3) measurement and evaluation experts.

The supervisor checked and repeatedly corrected the various items to ensure that the instruments were appropriate for the collection of relevant data. Amendments and constructive changes were made before approval of instruments as good and valid for final administration.

The instruments were again presented to three experts for face, content and construct validation. These included an expert of Educational Measurement and Evaluation from the University of Buea, an expert of Education Management from the University of Yaounde I and another expert of Educational Measurement and Evaluation from the University of Yaounde I.

These experts were each presented with copies of the research purpose, research questions, research hypotheses and research design as a guide. They were requested to assess the suitability of the language, the comprehensiveness, adequacy and relevance of the items in addressing the research questions, bearing in mind the purpose of the study.

From these, the content validity index was calculated. This is because we intended to know the degree to which an instrument has an appropriate sample of items for the constructs being measured. An item content validity index was calculated for each item. Item content validity indexes greater than 0.78 were kept and items with a lower content validity index were edited or removed. The final instrument had an average scale-level content validity score of 0.82 from 15 items.

$$content\ validity = \frac{\text{Number of items declared valid}}{\text{Total number of items}}$$

Reliability of the Research instruments

The questionnaire was trial tested with 30 teacher trainers from other teacher training colleges which is outside the area. Since the different clusters of the questionnaire contained non-dichotomously scored items, the internal consistency of each of the clusters was determined using Cronbach alpha. This technique was chosen because of its inter-item correlations. That is, the correlation of each item with the sum of all the other items. Reliability estimates for the clusters were as follows; cluster A: 0.81; cluster B: 0.83; cluster C: 0.79; cluster D: 0.84; cluster E: 0.83 and cluster E: 0.80. The instrument has an overall reliability estimate of 0.80

Cronbach alpha is expressed as

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum \sigma \frac{2}{k}}{\sigma^2}\right)$$

Where:

$\sum \sigma \frac{2}{k}$ is the sum of the variances of the k parts which are the items of the test or instrument.

$\sigma =$ standard deviation of the test or instrument.

5.7. ADMINITRATION OF THE INSTRUMENTS

The questionnaire was administered using the face to face or direct delivery technique. Participants were approached by the researcher in their respective schools were accessible to her and through her assistants to schools where physical accessibility by the researcher in person was difficult. What the researcher did with the physically inaccessible schools was to send electronic copies through emails and WhatsApp in box to the assistants in the respective geographical location. These assistants printed out the questionnaires and carried out the face to face / direct delivery technique in administering the questionnaires. The respective assistants printed out the required number of questionnaire samples and carried out administration. The interview was administered to the sampled participants (regional inspectors) through the face-to face interview administration technique.

As earlier mentioned, the researcher did not work alone, she worked with other colleagues with whom she had created a working relationship in the different selected teacher's training colleges. Scanned copies of questionnaires were sent through the inboxes of the various assistances (colleagues) in the different selected schools such as GBTTC Garoua,

GBTTC Bafousam, GBTTC Bamenda because of the distance and insecurity. But for GBTTC Yaounde, GTTC Mfou and GTTC Mbalmayo, the researcher administered the questionnaire herself since these areas were closer and accessible to her.

The Assistance (Colleagues) were equally wired money through mobile money network to facilitate their task. This money was used in printing out the required number of copies needed for the different samples of the various schools. The printed copies were now distributed to the sampled population by the assistants. After participants in the various selected colleges had responded, the answered questionnaires were sent to the researcher through transport mail services (bus agencies) and also the research assistants gave individuals who were coming to Yaounde to hand to the researcher.

The structure interview was done alone by the researcher through face-to-face and whatsApp. Through whatsApp, the researcher inbox the different questions on the interview guide to the conveniently selected sample. In this light, the researcher worked with participants of GBTTC Garoua, GBTTC Buea, and GBTTC Bamenda through whatsApp; and for participants of GBTTC Yaounde, GTTC Mfou and GBTTC Buea for example, she worked face-to-face with participants for the interview.

One of the tools used in collecting data in this study comprised of questionnaire. The Questionnaire structured following Likert Scale. It had twenty-five (25) questions which were further divided into five sections; that is, planning norms, planning process, planning context, planning constrains, and students' professional development. Graduated as follows: Strongly Agree (SA) = 4 scores, Agree (A) = 3 scores, Disagree (D) = 2, Strongly Disagree (SD) = 1 score. This meant that each section had 20 as maximum score and 5 as minimum scores. In this case, the sum maximum score was 100 and the minimum score of 25. Data from interview was collected through a face-to face interview sessions with different participants.

A questionnaire was the research instrument used for data collection. This is because it was examined and considered as the most suitable tool for collecting and analysing quantitative data. The questionnaire was constructed based on closed ended questions graduated into four major sections. Each section had five (5) question items which when sum up gave twenty-five (25) items that were based on the main variables of the study. The questionnaire equally had items relating to the background of the participants such as age, institution, and years of experience.

A questionnaire according to Wilson and Mclean (1994) in Cohen et al. (2007) refer to a data collection instrument widely used in carrying out survey studies because it is structured, numerical and it is easily administered, because it has the potentials of being administered with or without the physical presence of the researcher. A questionnaire also facilitates data analysis due its straight forward nature (Wilson and Mclean, 1994) in Cohen et al. (2007). These are the reasons justifying why the researcher used questionnaire for data collection. Also, questionnaire is a data collection tool that ensures confidentiality. Confidentiality ensures anonymity of respondents which is very favourable working environment so far as participants protection is concerned. This also makes respondents more relax because they are free of fear and void of any form of pressure or influence; thus making the instrument to possess the qualities of validity and reliability.

However, it is important to note that questions are not very easy to construct, questionnaires are time consuming and demanding; this is because when they are constructed, the have to be piloted, adjusted or corrected, and refined before being administered. also, the scope of collecting data using a questionnaire is limited because it is limited in scope and it is not flexible in providing response.

Table 18: Questionnaires distributed and responded to by teacher trainers

Distributed	Returned	Return Rate	Incomplete	Complete	Adjusted Return Rate
417	417	100%	00	417	100%

Table 18 shows that 417 questionnaires (copies) were shared in the chosen schools respectively. The return rate stood at a 100% due to the fact that all questionnaires shared to respondents were collected by the researcher and her assistants (most being colleagues) in the respective schools. Also, all of the different questions were answered by the participants who resulted in 417 fully answered questionnaires, with a rate of return of 100%**.**

5.8 METHOD OF DATA ANALYSIS

Both descriptive and inferential statistics were used in analyzing the instruments.

Descriptive Analysis

The questionnaire information was coded and summarized on tables and charts. Frequencies and percentages were used to provide an overall picture of the characteristics and opinions of

the Principals. Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) were assigned numerical point values of 4, 3, 2, 1 respectively. This gave a total of 10. Consequently, a mean of 2.5 was used as decision point. Specifically, the mean rating of each of the items was computed using the Statistical Packages for Social Sciences (SPSS) computer software version 25.0. The cut-off point of 2.50 was considered because it represented the mean of the continuum of the scale as stated above. These mean scores were used to answer the research questions.

Inferential Analysis

The Pearson Product Moment Correlation was used to verify the four hypotheses. This was chosen because we intended not only to assess the association but also to provide the strength of the linear association between the two variables. ICT Program and Professional Development of Teachers' Training Colleges. Questionnaire was analysed using mean, standard deviation and Pearson correlation, while the interview was analysed using percentages. The coded data from the questionnaires was entered into SPSS version 20v32bits and analysed. The open-ended questions and the other instruments were equally summarized and content-analysed.

Pearson Product Moment Correlation

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

This study has as dependent variable which is students' professional development in teacher training colleges. Questions were as well analysed under variables relating to students' professional development in teacher training colleges. Correlation analysis was used to establish the relationship between the dependent and independent variables, and the findings were reported using the American Psychological Association (APA) style.

5.9. ETHICAL CONSIDERATIONS

Ethics are the moral principles that a person must follow irrespective of the place or time. Following the scientific principles of a good research study, the researcher will consider some ethical issues to protect the interest of the subjects involved.

First and foremost, by assuring the authority of the Ministry, authorities of the Delegation and schools concerned and research participants that the research study will mainly be for academic purposes only and that confidentiality of information provided will be ensured.

Moreover, a consent form was signed by teacher trainers who participated. In this respect, ethical standards will be maintained in collecting information from the participants, by explaining to the learners the significance and helpfulness of the study. This will help to avoid wasting the respondents' time, which is unethical. Also, it is ethical to seek out the respondents' informed and expressed consent which must be done voluntarily and without pressure (Nana, 2012). The participants were adequately informed of the type of information needed from them, why the information is being sought, what purpose it will be made for, how it will be studied and how it directly or indirectly will affect them.

According to Bryman and Bell (2007) the following ten points represent the most important principles related to ethical considerations in thesis

1. Respect for the dignity of research participants should be obtained from the participants before prioritized
2. Full consent should be obtained from the participants before the study
3. The protection of the privacy of research participants have to be ensured
4. Adequate level of confidentiality of the research data be ensured
5. Anonymity of individuals and organizations participating in the research must be ensured
6. Any deception or exaggeration about the aims and objective of the research must be avoided
7. Affiliation in any form, sources of finding as well any possible conflict interest have to be declared
8. Any type of communication in relation to the research should be done in honesty and transparency

Any type of misleading information as well as representation of primary data in a biased way must be avoided. The issues of confidentiality and anonymity was seriously considered, so that whatever information given by the respondents were strictly used for the benefits of the study. On the part of the researcher, ethical considerations were made to avoid bias. She used appropriate research methods, checked for validity of the instruments, do correct report of findings without falsifying them, and appropriately used and managed data.

1 - INFORMED CONSENT

Introduction

I am Amombi Delphine Amana, a Ph.D. research student at the University of Yaoundé 1, Department of Management of education with the option of educational planning. I am caring out a study on "*Educational policy planning of ICT program and its effects on students'* competence *development in selected Teacher Training Colleges in Cameroon*". I am going to give you information and invite you to be part of this research. You do not have to decide today whether you will participate in this research. Before you decide, you can talk to anyone you feel comfortable with about the research. In case there are some words you do not understand please ask me to stop as we go through the information and I will take time to explain. If you have any question(s) later, you ask them from me.

Purpose of the research

Despite much talks on the promotion of ICTs in schools and the benefits that are offer to our learners, there still exist several challenges in implementation. ICTs greatly facilitate educational achievements and consequently changes our students so they can fit in the society effectively. The study finds out how appropriate ICT programs can be planned in order to improve students' skills, competence, and knowledge.

Participant selection

We are inviting all teacher trainers teaching in Teacher Training Colleges.

Voluntary participation

Your participation in this research is entirely voluntary. It is your choice to participate or not. Whether you participate or not your status in the society will remain the same. If you choose to participate in this research study, you will still maintain your social status. You may change your mind later and stop participating even if you agreed earlier.

Procedure

We will collect information from you through the use of a notebook, with pen, recorder, and camera, social media plateform if possible. This information will be collected for a period of about one month. We may come back to you for more precisions and explanations or verification of information collected from you. At the end of the exercise, this information known as data will be analyzed and interpreted to bring out how planning ICT program is related to professional development of student teachers.

Description of the process

During this research, we will keep an appointment on when and where to meet you. At our meeting point, you will be asked questions about how the 2013 ICT teacher training program is organised.

Duration

This research is an academic exercise and I have been authorized to spend at most one year on the field. So, I will like our appointments to be kept at the earliest time possible.

Risk

By participating in this research, it is possible that you will be at greater risk than you would otherwise be. We will try to decrease the chances of this occurring. But if something unexpected happened, we will provide you with justifications and backings.

Benefits

This study will help recommend a model of planning ICT program in Teacher Training College.

Confidentiality

The information that we will collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and only the researcher and academic supervisor will be able to see them. Any information about you will have a number on it instead of your name. Only the researcher will know what your number is and we will lock that information up with lock and a key. It will not be shared with or given to anyone except my supervisor and the academic department.

Sharing the results

The knowledge that we get from doing this research will be shared with you through academic meetings before it is made widely available to the public. Confidential information will not be shared. We may publish the results in order that other interested people may learn from our research.

Right to refuse or withdraw

You do not have to take part in this research if you do not wish to do so and refusing to participate will not affect your social status in this community. You may stop participating in the research at any time that you wish to without losing anything.

2 - CERTIFICATE OF CONSENT

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Name of participant _____

Signature of participant _____

Who to contact?

If you have any question(s) you may want to ask them now or later, even after the study has started. If you wish to ask questions later, you may contact any of the following; the Department of management of education, university of Yaoundé 1

Date _____

If unable to read

I have witnessed the accurate reading of the consent form from the potential participant, and the individual has had the opportunity to asked question I confirm that the individual has given his/her consent freely

Name of witness _____

Signature of witness _____

Date _____

Statement by the researcher /person taking consent

I have accurately read out the information sheet to the potential participants, and to the best of my ability made sure that the participant understands that the following will be done;

- Observation
- In-depth interview
- Notes –taking
- Snapshots.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participants have been answered correctly and to the best of my ability. I confirm that the individual has not been coercive into giving consent and the consent has been given freely and voluntarily.

A copy of ICF has been provided to the participants

Name of researcher/person taking the consent _____

_____

Signature of researcher/person taking consent _____

Date _____

Concern Clearance

The research obtained authorisation from the Faculty of Sciences of Education, University of Yaounde 1 before going to the field to collect data.

Voluntary Participation

The teacher trainers and pedagogic inspector voluntarily took part in the study, by wilfully responding to the questionnaire items and the interview questions respectively. The researcher educated Participants on to respond to the items on both the questionnaire and interview guide. They worked at their convenience under duress.

Anonymity and Confidentiality

The participants were physically and psychologically assured on their anonymity and confidentiality. That is why the names of respondents were not written on the questionnaire nor was their private data exposed. The principle of confidentiality was also applied to interview respondents and their responses.

5.8.3 Activity plan for research

Table 19 below shows how the research work was planned from 2018 to 2021

Table 19: Activity plan for research

Activities	Tasks	Duration	Start date	Finished date	Observation
DOCUMENTATION	1.Reading 2.Surfing	8 Months	01/02/18	27/09/18	In Progress
FIELD WORK	1.Training of Data collectors 2.Instrumentation	1 Month 1 Month	12/10/19 15/02/20	12/11/19 15/02/20	In progress Not in progress
COMPILATION	1.Data Analysis by the statistician	3 Months	15/02/20	15/05/20	Awaited
WRITTING	1.Chapter One 2.Chapter Two 3. Chapter Three 4.Chapter Four 5.Chapter Five 6.Chapter Six 7.Chapter Seven	1 Week 1Month 1 Month 1 Month 1 month	15/05/20 20/05/20 20/06/20 20/07/20 20/08/20	20/05/20 20/06/20 20/07/20 20/08/20 20/09/20	In progress In progress In progress In progress Awaited awaited
CORRECTION	1.By Supervision 2.By Supervisee	3 Months	20/09/20 02/01/21	02/01/21 02/02/21	In progress In progress
EDITTING	1.Editor 2.Supervisee 3.Supervisor	1 month 2 weeks 1 week	02/01/21 02/03/21 16/04/21	02/02/21 16/02/21 23/04/21	Awaited
PRINTING AND SUBMISSION	Researcher	2 weeks	14/05/21	31/05/21	Submission

5.8.3 Estimated budget for Ph.D. research

The estimated budget of this research work stood at 1,88000frs seen in table 20 below

Table 20: Estimated budget for Ph.D. research

ACTIVITY	EQUIPEMENTS	QUANTITY	UNIT PRICE	NET PRICE
Documentation	Laptop USB keys Memory card Card reader	01 03 03 02	300.000 4000 2000 500	300.000frs 20000frs 6000 1000
Surfing	Internet Photochromic glasses Books (hard /soft)	Monthly activation 01	5000 20.000	100.000 40000 100000
Field work	Training of data collectors Instrumentation/ Transport to field	05	20.000 125000	155000
Printing	Draft for supervision: first copy Draft for supervision: second copy Final copies	3 3 3		40.000 50000frs 80000frs
Miscellaneous				120000frs
TOTAL				1,88000frs

Source: Researcher's Computation (2021)

5.9.0. CONCLUSION

This section of the work has described the methods and instruments used to collect data for the study. It has also presented the research design, the area of the study, population of the study, sample and sampling procedure, instrument for data collection, validation of research instruments, data collection and method of data analysis, ethical consideration, plan of research activities, and budget estimate.

CHAPTER FOUR
DATA PRESENTATION AND FINDINGS

6.0. INTRODUCTION

This section of the research report (work) presents the results obtained from the study and analyses of collected data from the field. This is done through percentages, tables, charts, frequency, graphs, using correlation. The first section comprises of the descriptive analysis of the identified characteristics. The second section examines the focus group discussion, and the fourth section does hypotheses verification.

6.1.0. DATA PRESENTATION

The main purpose of this research work study was to find out the policy planning of ICT program and its effects on students' competence development. Selected Teacher Training Colleges in Cameroon were used to bring out the results.

The researcher exploited questionnaires to carry out a survey and an interview among inspectors of the chosen regions to bring out results. The research objectives were as follows:

1. Establish the extent to which ICT program norms affect students' professional development in teacher training colleges.
2. Investigate how ICT program planning process affects students' professional development in teacher training colleges.
3. Establish the extent to which ICT program planning context affects students' professional development in teacher training colleges?
4. Investigate how ICT program planning constraints affect students' professional development in teacher training colleges

The presentation of analysis in this chapter for the questionnaire respects collected data of April, 2020 and that of focus group discussions dates from June to November 2020. This chapter is structured into four sub sections: demographic information presentation, research questions responses, verification of hypothesis, and presentation of a summary of the findings based on the results gotten with respect to the objectives, research questions and hypothesis.

The data analyses done in this part of the work focuses on effectively and efficiently describing and measure the relationships between variables and their respective strengths. In this regard, bivariate descriptive statistics describes such relationships. This study with 417 teacher trainers in Primary Teacher Training College of public institutions in Cameroon also

took interest in their background characteristics (Region of origin, gender, marital status, age category).

6.2.0. PRESENTATION OF THE DISTRIBUTION OF THE TARGET POPULATION ACCORDING TO VARIABLES

This part presents the distribution of participants of the study according to schools, region of origin, gender, age group, and interview respondents.

6.2.1. Demographic (Background) Information

Distributions of respondents according to regions, schools, gender, marital status, age groups and longevity is seen below in various tables and figures.

Table 21: Distribution of the participants according to schools

Schools	Respondents	Percentages (%)
GBTTC Yaounde	40	09.59%
GTTC Mbalmayo	42	10.07%
GTTC Mfou	43	10.31%
GBTTC Kumba	26	06.23%
GTTC Buea	40	09.59%
GTTC Bangem	16	03.83%
GBTTC Maroua	25	06.00%
GTTC Kousseri	18	04.31%
GTTC Mokolo	27	06.50%
GBTTC Bamenda	46	11.03%
GTTC Fundong	16	03.83%
GTTC Kumbo	13	03.11%
GBTTC Bafoussam	30	07.20%
GTTC Dschang	20	04.80%
GTTC Mbouda	15	03.60%
Total	**417**	**100%**

Source: Researcher's Computation (2021)

From table 21 above, GBTTC Yaounde and GTTC Buea had 40 participants each making up a total of 09.59% and 09.59% of the sample pouplation respectively. GTTC Mbalmayo had 42 participants making a total of 10.07% of the sampled population. GTTC

Mfou had the highest of 43 participants making a total of 10.31% of the sampled population. While GBTTC Kumba had 26 participants making a total of 06.23% of the sampled population. GTTC Bangem had 16 participants making a total of 03.83% of the sampled population. GBTTC Maroua had 25 participants making a total of 06.00% of the sampled population. GTTC Kousseri had 18 participants making a total of 04.31% of the sampled population. GTTC Mokolo had 27 participants making a total of 06.50% of the sampled population. GBTTC Bamenda had 46 participants making a total of 11.03% of the sampled population. GTTC Fundong had 16 participants making a total of 03.83% of the sampled population. GTTC Kumbo had 13 participants making a total of 03.11% of the sampled population. GBTTC Bafoussam had 30 participants making a total of 07.20% of the sampled population. GTTC Dschang had 20 participants making a total of 04.80% of the sampled population. And GTTC Mbouda had 15 participants making a total of 03.60% of the sampled population.

Figure 10: Distribution of respondents according to Region of origin

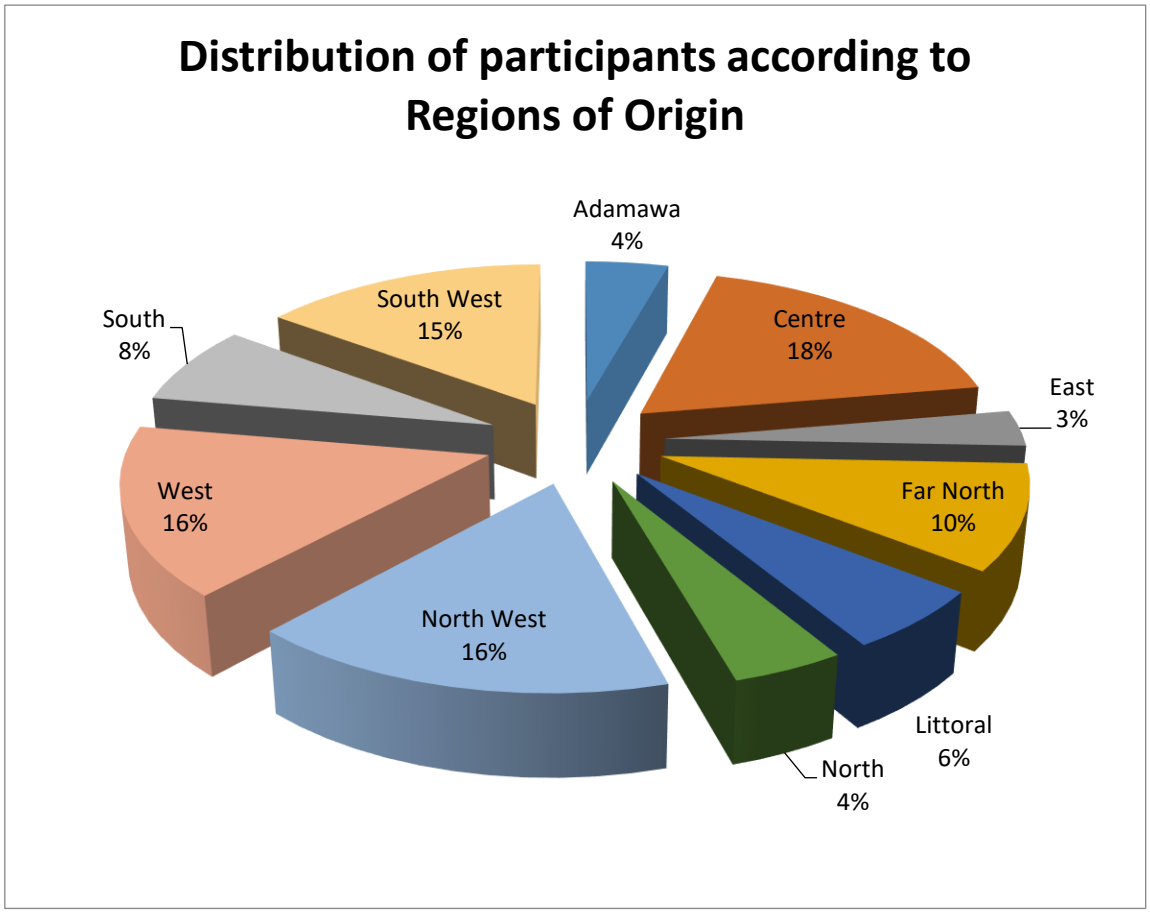


Figure 10 above shows that the majority of participants in this study originated from the Centre region with a percentage of 18, 75 participants. While the North West and West

regions with a percentage of 16 each with 68 and 66 participants respectively. They were followed by South West regions with 15% and 62 participants. The least was the East region with 3% followed by the Adamawa and North regions with 4% each and with 14, 18 and 18 participants respectively. The South region had a percentage of 08 with 31 participants, and the Littoral region with 06%, and 24 participants. This resulted in a total of 417 participants scoring a percentage of 100%.

Figure 11: Distribution of participants according to Gender

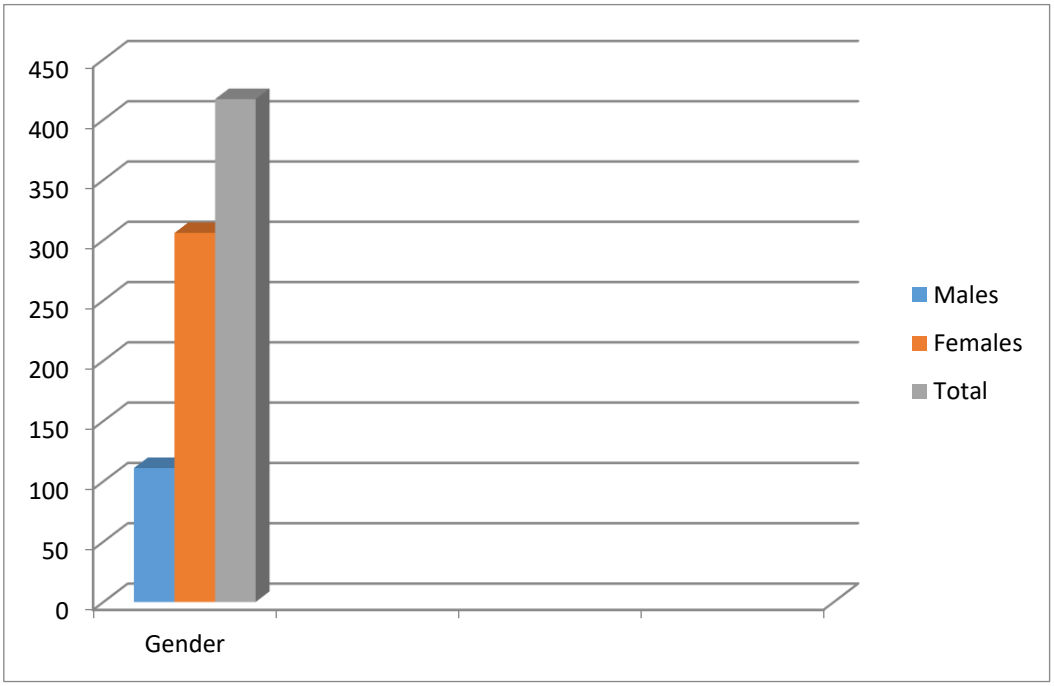


Figure 11 above establish that females were the majority of the sample population as well as the final participants with 306 participants, scoring a percentage of 73. The male gender was the least with 111 participants constituting 27% of the total participants.

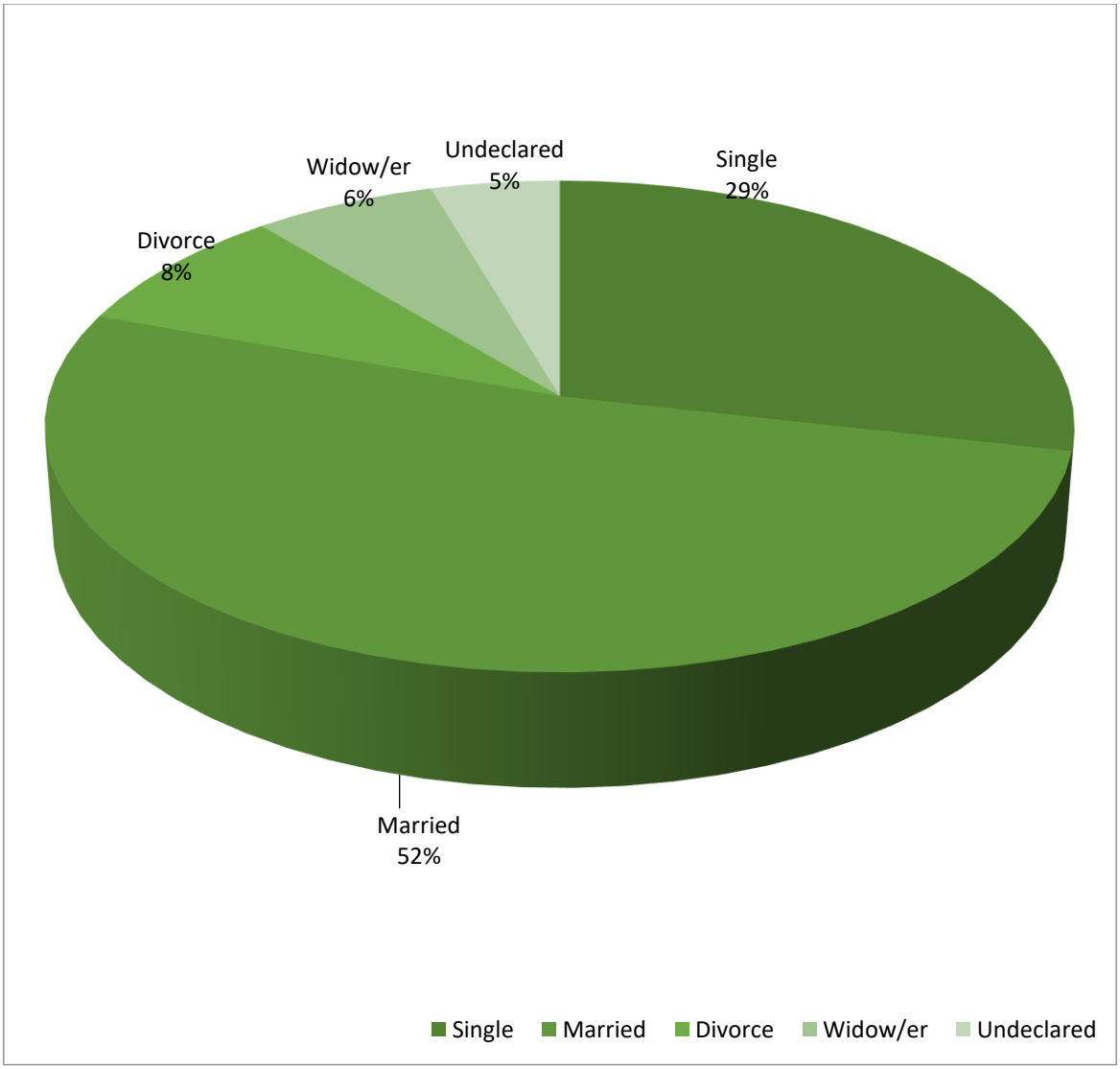


Figure 12: Distribution according to marital status

Figure 12 above shows marital status of respondents, majority of the participants are married with a percentage of 52 and 217 participants. While single participants constituted 29% of the participants with 119 population of the participants. The rate of divorced participants stood at 08%, constituted by 08 participants. While 06% of the participants were widows or widowers constituting 27 participants and the percentage of those who refused to declare their marital status stood at 05% and constituted 19 participants.

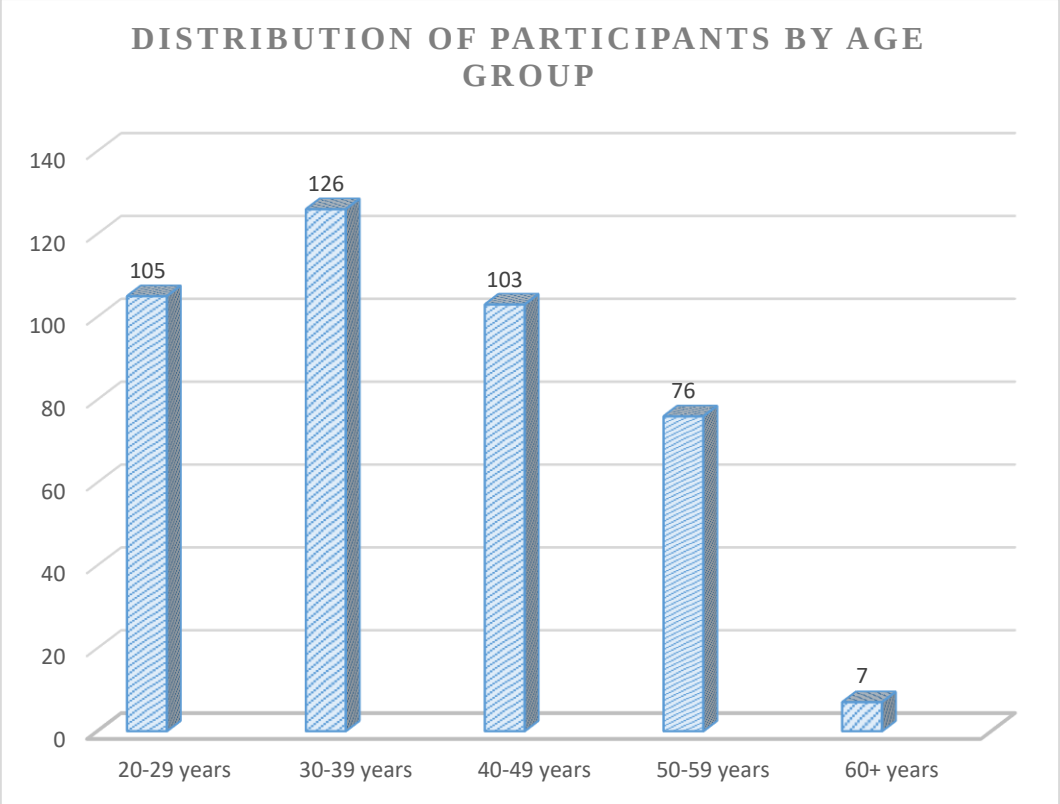
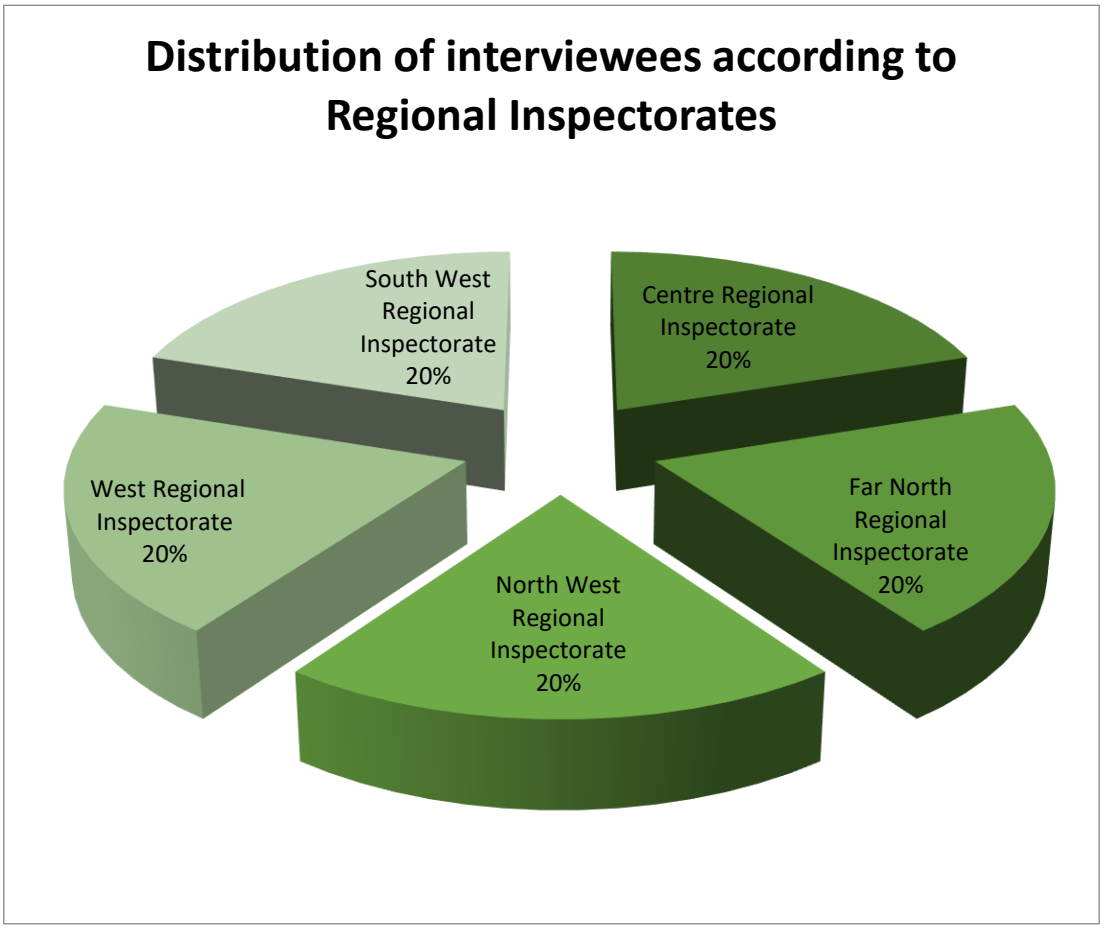


Figure 13: Distribution of respondents by Age Group

The distribution of participants by age group is illustrated by the histogram. Examining figure 13 above, the highest number of participants of 126 with 30% are between the ages of 30-39 years. This is closely followed by participants of ages below 20 (161) with a percentage of 37, closely followed by the ages 20 to 29 and 40-49 with each group constituting 25% of the participants respectively, with a population of 105 and 103 participants respectively. They are followed by the age group 50-59 with a percentage of 18, with 76 participants. While the least age group amongst the participants was 60+ with 02% and 7 participants.

Figure 14: Distribution of interview participants according to regional inspectorates



From figure 14, the number of inspectors interviewed from centre, far north, north west, west, and south west regions of respectively of the Republic of Cameroon. Two (2) inspectors were interviewed from each regional delegation of the five regions, from the inspectorate of teacher training. These inspectors have a direct link with the planning and teaching of ICT program and activities respectively in teacher training colleges. the sample of the interview therefore stood at 10, with a percentage of 20% per regional inspectorate of th Regional Delegation for Secondary Education.

Figure 15: Distribution by longevity in the teaching profession

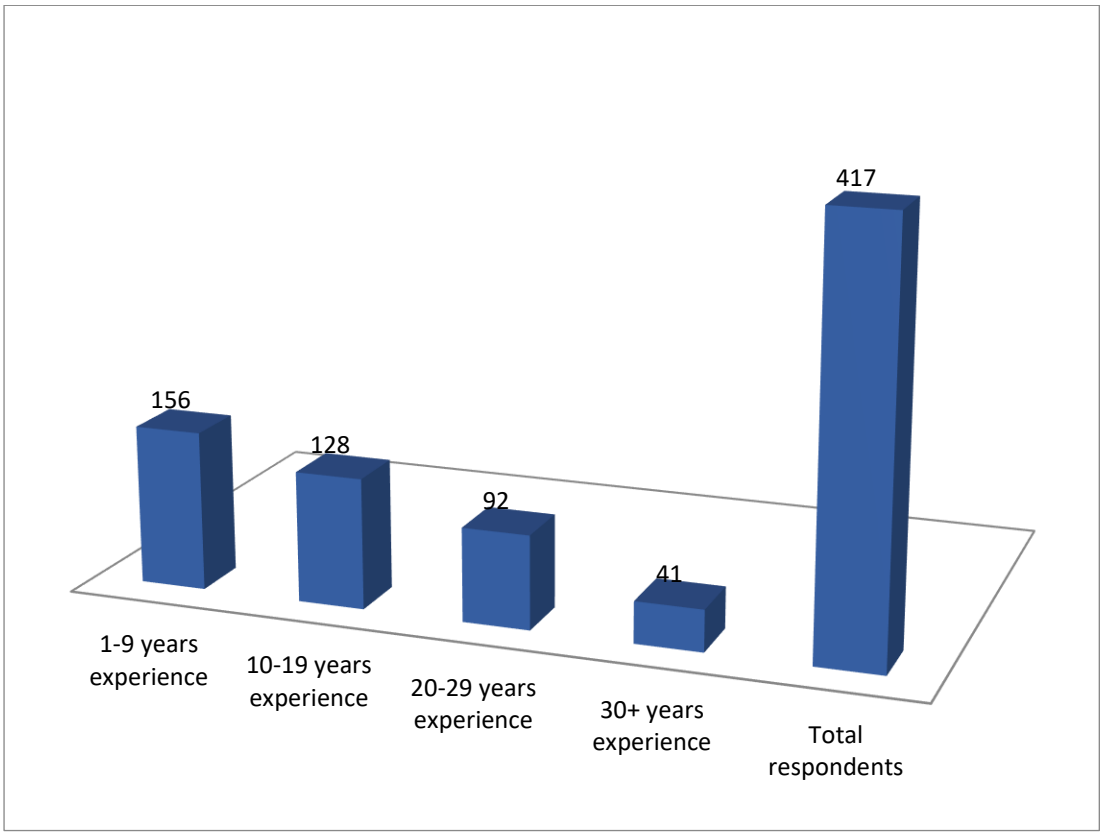


Figure 15 shows the number of years spend by teachers in the teaching profession. A total of 156 teachers out of 417 have spent less than ten years while the rest have spent 10 years and above.

6.3.0. Presentation of Quantitative Data Collected From Teachers

This section presents details on four research questions and there is one section that focuses on the dependent variable. The research questions of ICT program planning were as follows:

1. **To what extent does ICT program planning norms affect students' competence development in teacher training colleges?**

Table 22: Response rates of questionnaire on planning norms section

SN	STATEMENTS	Strongly Agree (SD)	Agree (A)	Disagree (D)	Strongly Disagree (SD)
		4/4	¾	2/4	1/4
	PLANNING NORMS OF ICT PROGRAM				
11	The Educational laws are relevant in facilitating students' knowledge acquisition in of ICT	284	128	05	00
12	The objectives of the ICT program promote students' development of Skills	255	157	05	00
13	Assessment methods of ICT is geared towards improving students' competences	271	133	13	00
14	The use of External instruments on the ICT program reduces the students' academic performance.	00	09	127	281
15	ICT reforms has greatly influence students' acquisition of knowledge in the ICT Program	275	130	12	00

Table 22 indicates that a great majority of the participants choose strongly agreed and agreed respectively. Indicating that national instruments, goals, assessment methods, and international instruments as components of planning norms of ICT program significantly influences the ICT program and contribute to students' professional development in the teacher training sector. With this, national instruments, goals, assessment methods, and international instruments have to be carefully exploited in planning ICT programs in Teacher Training Colleges in Cameroon in developing program policy and professional orientation.

The sum for statements of each section on the questionnaire was 20 (4points x 5 statements). The questionnaire had a sum of twenty-five (25) questions in five (5) sections while each section hard five (5) items with one distractor. Therefore, in each section a participant who answered all the questions in the section all things being equal could not score less than 4 marks or above 20 marks. In the section of planning norms 34 participants scored 18 which was the least, 206 scored 17 and were the highest, 141 scored 16 and 36 scored 15 as shown on the pie chart of figure 15 below.

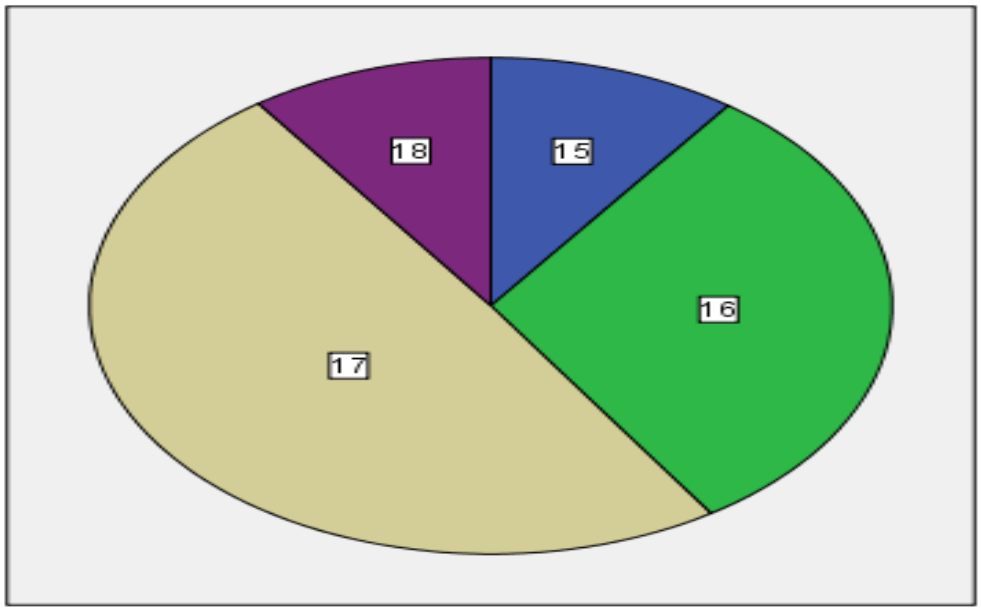


Figure 16: Pie chat presentation of participants according to total scores on planning norms

2. **Does ICT program planning process affect students' competence development in teacher training colleges?**

Table 23: Response rates of questionnaire on planning process section

SN	STATEMENTS	Strongly Agree (SD)	Agree (A)	Disagree (D)	Strongly Disagree (SD)
		4/4	3/4	2/4	¼
	PLANNING PROCESS OF ICT PROGRAM				
11	Diagnosing the societal needs has facilitated students' knowledge acquisition of the ICT program.	168	227	13	09
12	Effective implementation of the ICT program in the classroom promotes the quality of skills developed by students	218	184	09	06
13	Monitoring the ICT program execution in the classroom increases students' academic performance in ICTs and DETs	188	225	03	01
14	ICTs and DETs subjects are not frequently being evaluated in our teacher training colleges so as to boost up students' competence in the society.	214	201	02	00
15	Students have acquired limited knowledge from the ICT program due to inefficient implementation.	189	09	09	15

Table 22 present a majority of the participants responded positively to strongly agree and agree. Indicating that planning process from the perspective of diagnosis, implementation, monitoring and evaluation, as components of planning process of ICT program significantly influences ICT program and contribute to students' professional development in the teacher training sector. For this reason, planning process should be constantly taken into consideration in teacher training program planning processes of ICT programs.

The section of planning process on the questionnaire had its highest participants of 170 with a sum score of 20, followed by 124 participants with a sum score 18, 123 participants scored 19, and 45participants scored a sum score of 15, which was the least. This is best illustrated by the figure below.

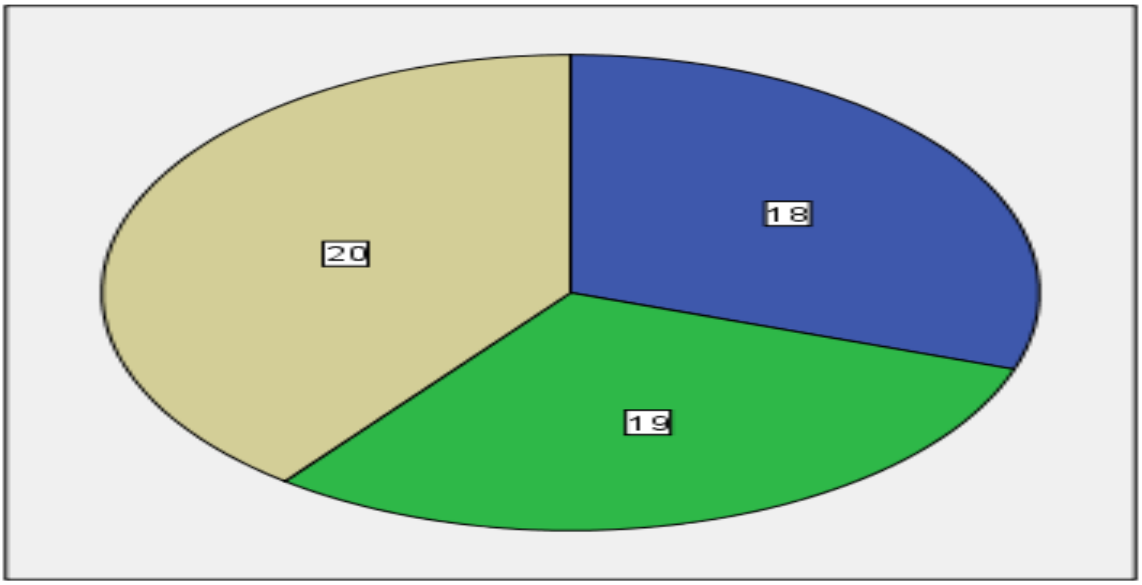


Figure 17: Pie chat presentation of participants according to total scores on planning process

3. **To what extent does ICT program planning context affect students' competence development in teacher training colleges?**

Table 24: Response rates of questionnaire on planning context section

SN	STATEMENTS	Strongly Agree (SD)	Agree (A)	Disagree (D)	Strongly Disagree (SD)
		4/4	3/4	2/4	1/4
	PLANNING CONTEXT OF ICT PROGRAM				
1	Addressing the financial level of Cameroon when planning the ICT program helps in fulfilling students' knowledge.	232	182	00	03
2	The socio-political issues in Cameroon increase the quality of skills students develop in the ICT program.	00	00	186	231
3	Once health situation is considered in planning ICT program, students' academic performance will be improved.	205	207	05	00
4	The insufficiency of trained teachers in ICT contributes in hindering students' competences.	216	189	08	04
5	Students' Knowledge in technology will be adequate if the context of the ICT program is well developed.	198	207	07	05

Table 24 indicates that a majority of participants responded positively to strongly agree and agree. Proving that financial issues, Socio-political issues, health issues, and resources as components of planning context of ICT program significantly influence the planning context of ICT program, contributing to students' competence development in through ICT programs.

On the questionnaire, the part on planning context had its highest positive responses of 209 with a total score of 17, followed by 80 responses with a total score 16, 44 respondents scored 18, and the least was 42 and 42 respondents who respectively scored a sum of 14 and 15 respectively on the 20 points in the section. This is clearly described and illustrated by the figure 18 below.

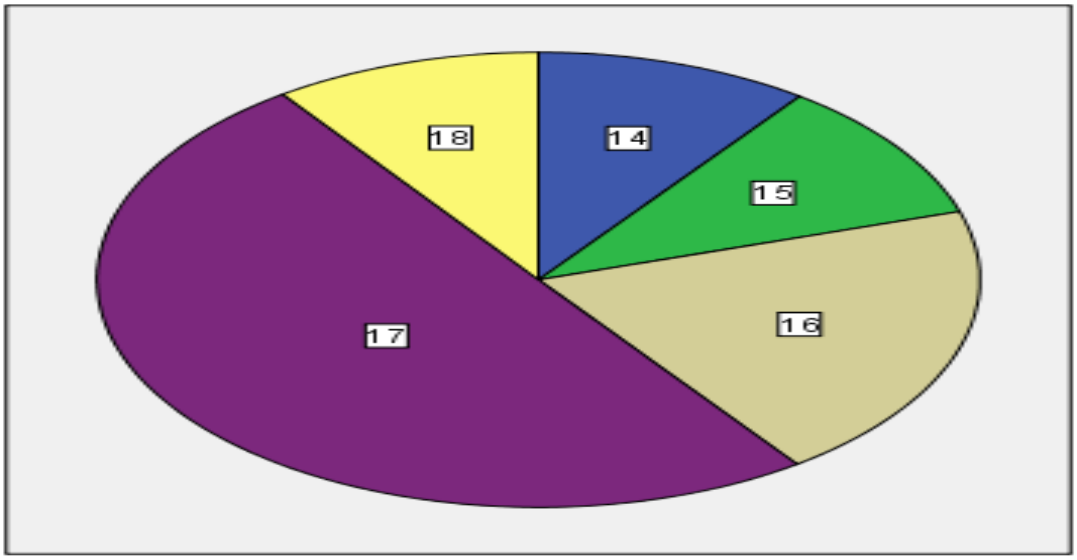


Figure 18: Pie chat presentation of participants according to total scores on planning context

4. **Does ICT program planning constraints affect students in competence development teacher training colleges?**

Table 25: Response rates of questionnaire on planning constraints section

SN	STATEMENTS	Strongly Agree (SD)	Agree (A)	Disagree (D)	Strongly Disagree (SD)
		4/4	3/4	2/4	1/4
	PLANNING CONSTRAINTS OF ICT PROGRAM				
11	Students in the Teacher Training Colleges in the urban areas acquire more knowledge in the ICT program than their counterparts in rural areas.	206	199	07	05
12	A well-organized ICT program promotes students' development of skills	201	206	05	04
13	Using different strategies in the ICT program hinder the quality of skills students' professional development	00	00	194	223
14	Inadequacy of required technology does not help in stimulating students' academic performance in ICT program	245	169	02	01
15	Knowledge acquisition in ICT and DETs by the teachers is very helpful to the success of the ICT program in Teacher Training Colleges	178	232	05	02

Table 25 indicates that a majority of the participants responded positively to strongly agree and agree. Therefore, the environment (urban and rural), organisation, strategies, and technology are projected as components of planning constraint which significantly influence the planning constraints of ICT program, and contribute to students' professional development in teacher training colleges. This is done through the development of knowledge and skills, improving academic performance, and enhancing competencies. Therefore, has to be taken into consideration in the teacher training ICT program planning processes.

The section of planning constraint in the questionnaire had the highest participants of 170 with a sum score of 20, followed by 124 respondents with a sum score 18, and the least was 123 respondents who scored a sum of 19 on the 20 points in the section. This is best explained and illustrated by the pie chat on figure 18

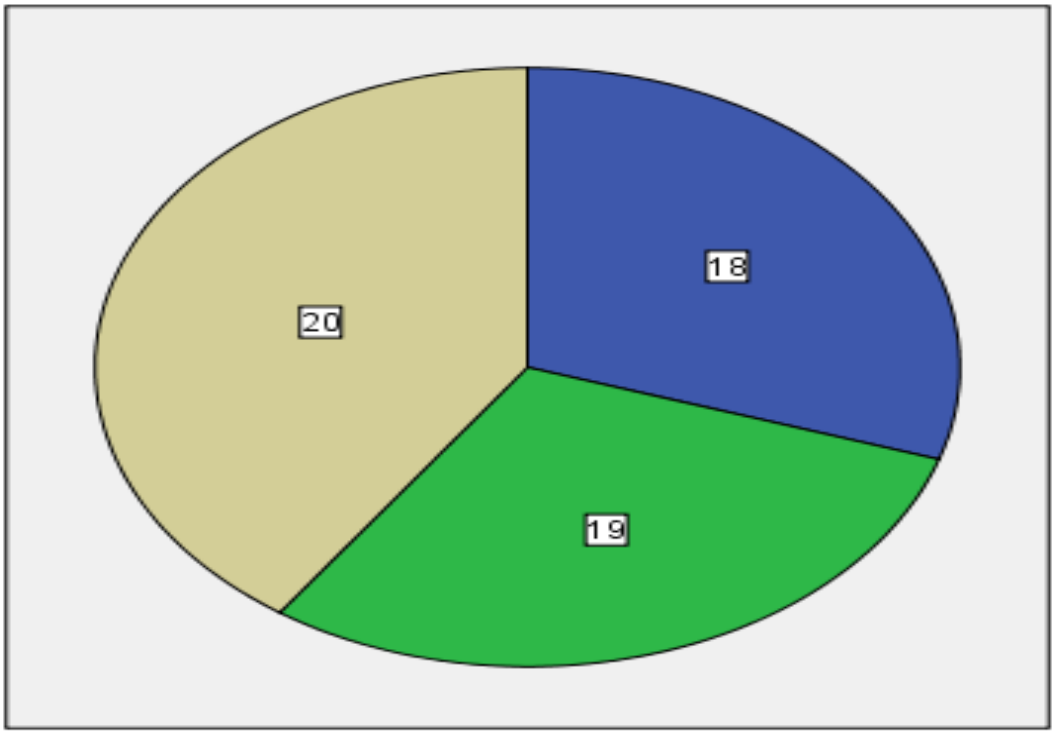


Figure 19: Pie chat presentation of participants according to total scores on planning constraint and Students' competence development (Dependent variable).

Table 26: Response rates of questionnaire students' competence development section

SN	STATEMENTS	Strongly Agree (SD)	Agree (A)	Disagree (D)	Strongly Disagree (SD)
		4/4	¾	2/4	¼
	DEPENDENT VARIABLE				
11	Students' knowledge acquisition in ICTs and DETs are motivated by the norms of planning of the ICT program	200	205	06	05
12	Students' skills development in ICT is hindered when effective diagnoses are not made about the societal needs of students.	225	185	05	02
13	Students' academic performance is promoted if the ICT program is tailored in a particular nature so as to conform to the needs of student teachers.	215	193	06	03
14	Students' knowledge acquisition in ICT and DETs have not been hindered by the challenges of the ICT program	07	10	176	224
15	Students' competences from the ICT program are effectively improved by strict respect of the implementation stages of the CBA when teaching.	206	200	07	04

Table 26 projects that a majority of participants responded positively to strongly agree and agree. Indicating that students' knowledge construction, skills development, academic performance, and competencies are components of students' professional development with regard to ICT program are significantly influenced by planning norms, planning process, planning context, planning constraint of ICT program. These variables in return significantly contribute to students' professional development in ICT program in the teacher training sector.

The students' professional development part on the questionnaire experience highest number of respondents of 169 with a sum score of 17, followed by 140 participants with a sum score 14, 82 participants scored 15, and the least was 26 participants who scored a sum of 16 on the 20 points in the section. This is best be explained by the pie chat on figure 19

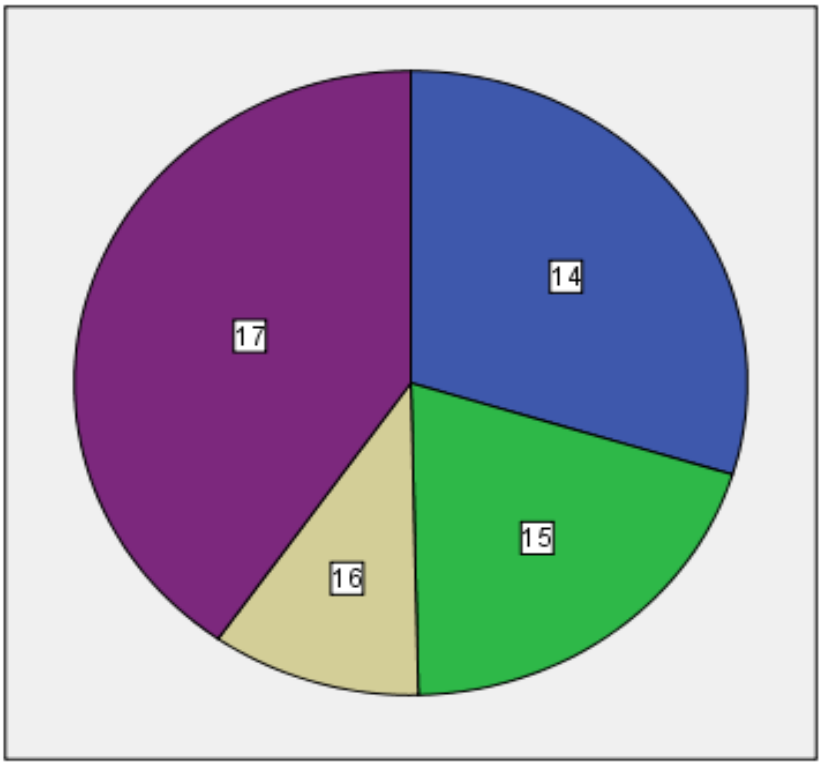


Figure 20: Pie chat presentation of participants according to total scores on students' competence development

6.3.0. VERIFICATION OF RESEARCH HYPOTHESIS

This section focuses on the research hypotheses in the perspective of findings obtained from quantitative data.

6.3.1. Research Hypothesis I:

The ICT program planning norms significantly affects students' competence development in TTCs.

Table 27: The mean and standard deviation of the answers on research hypothesis 1

Descriptive Statistics			
	Mean	Std. Deviation	N
Planning norms	16.59	.801	417
Students' Professional development	15.61	1.282	417

Table 27 shows the mean of planning norms at 16.56 against 15.61 for answers on students' professional development for 417 participants. The standard deviation of 0.80 for planning norms and 1.28 for students' professional development indicates that a majority of the scores were close to the mean. N on the table represents the sum number of participants

who attempted answers to the questionnaire.

Table 28: Bivariate correlation of planning norms and students' competence development

Correlations			
		Planning norms	Students Professional development
Planning norms	Pearson Correlation	1	.127**
	Sig. (2-tailed)		.010
	N	417	417
Students' Professional development	Pearson Correlation	.127**	1
	Sig. (2-tailed)	.010	
	N	417	417
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 28 shows Pearson correlation for planning norms and students' competence development, which has a coefficient of 0.13, the level Significance stood at 0.02, indicating a correlation significance level of 0.01 (2-tailed). N represents the sum of participants (teachers). In order to obtain the coefficient of determination (r^2), Pearson correlation coefficient is 0.02, $(0.13)^2$=0.02. 0.02(100), the result is 02.00. This 02% variance value indicates that, 2% of the variance in the dependent variable (students' professional development) has as cause the independent variable (planning norms). Therefore, 02% of the variance in students' professional development is effectively explained by planning norms. This is a two tailed significance case and the correlation is bidirectional. This means that 02% of the variance in planning norms is effectively influenced by students' professional development.

Therefore, it can be affirmed that there is a significant relationship between the planning norms of ICT program and students' professional development in TTCs. In this case hypothesis one (1) is confirmed.

6.3.2. Research Hypothesis 2:

The ICT program planning processes significantly influence students' competence development in TTCs.

Table 29: The mean and standard deviation of the responses on research hypothesis 2

Descriptive Statistics			
	Mean	Std. Deviation	N
Planning process	19.09	.831	417
Students' competence development	15.61	1.282	417

Table 29 shows the mean of planning process at 19.09 against 15.61 for responses on students' professional development for 417 participants. The standard deviation of 0.83 for planning process and 1.28 for students' professional development indicates that a majority of the scores were close to the mean. N on the table represents the sum number of participants who attempted answers to the questionnaire.

Table 30: Bivariate correlation of planning process and students' competence development

Correlations			
		Planning process	Students Competence development
Planning process	Pearson Correlation	1	.152**
	Sig. (2-tailed)		.002
	N	417	417
Students' Competence development	Pearson Correlation	.152**	1
	Sig. (2-tailed)	.002	
	N	417	417
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 30 shows Pearson correlation for planning process and students' competence development, which has a coefficient of 0.15. Significance stood at 0.002, indicating a significance level of 0.01 (2-tailed). N represents the sum of participants (teachers). To calculate the coefficient of determination (r^2), Pearson correlation coefficient stands at 0.02, $(0.15)^2$=0.02. 0.02 (100), the answer is 02.00. This 02% variance value shows that, 02% of the variance in the dependent variable (students' professional development) has as cause the independent variable planning process. Therefore, 02% of the variance in students' professional development is explained by the (planning process). This is a two tailed significance case with a bidirectional correlation. This explains that 02% of the variance in planning process is effectively influenced by students' professional development.

In this case, there is a significant relationship between the planning process of ICT program and students' professional development in TTCs. This therefore confirms hypothesis

two (2).

6.3.3. Research hypothesis 3:

ICT program planning context significantly affects students' competence development in TTCs

Table 31: The mean and standard deviation of the answers on research hypothesis 3

Descriptive Statistics

	Mean	Std. Deviation	N
Planning context	16.40	1.116	417
Students' competence development	15.61	1.282	417

Table 31 shows the mean of planning context at 16.40 against 15.61 for answers on students' competence development for 417 participants. The standard deviation of 1.12 for planning process and 1.28 for students' professional development indicate that a majority of the scores are close to the mean. N on the table represents the sum number of participants who attempted answers to the questionnaire.

Table 32: Bivariate correlation of planning context and students' competence development

Correlations

		Planning context	Students Competence development
Planning context	Pearson Correlation	1	.403**
	Sig. (2-tailed)		.000
	N	417	417
Students' Professional development	Pearson Correlation	.403**	1
	Sig. (2-tailed)	.000	
	N	417	417

**. Correlation is significant at the 0.01 level (2-tailed).

Table 32 shows Pearson correlation for planning context and students' competence development. The coefficient of 0.40, Significance is at 0.00, leading to a significance level of 0.01 (2-tailed). N represents the sum of participants (teachers). To calculate the coefficient of determination (r^2), Pearson correlation coefficient is at 0.40, $(0.40)^2$=0.16. 0.16(100), the answer is 16.00. This 16% variance value shows that, 16% of the variance in the dependent variable (students' professional development) has as cause the independent variable (planning

context). In this case, 16% of the variance in students' competence development is explained by planning context. This is a two tailed significance case and the correlation is bidirectional. This means that 16% of the variance in planning context is influenced by students' professional development.

In this case, there is a significant relationship between the planning context of ICT program and students' professional development in TTCs. This confirms hypothesis three (3).

6.3.4. Research hypothesis 4

The ICT program planning constraints significantly influence students' competence development in TTCs.

Table 33: The mean and standard deviation of the answers to research hypothesis 4

Descriptive Statistics			
	Mean	Std. Deviation	N
Planning constraints	19.10	.833	417
Students' competence development	15.61	1.282	417

Table 33 shows the mean of planning constraints at 19.10 against 15.61 for answers on students' professional development for 417 participants. The standard deviation of 0.83 for planning constraints and 1.28 for students' professional development indicate that a majority of the scores are close to the mean. N on the table represents the sum number of participants who attempted answers to the questionnaire.

Table 34: Bivariate correlation of technical quality and students' competence development

Correlations			
		Planning constraints	Students Professional development
Planning constraints	Pearson Correlation	1	.509**
	Sig. (2-tailed)		.000
	N	417	417
Students' Professional development	Pearson Correlation	.509**	1
	Sig. (2-tailed)	.000	
	N	417	417
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 34 shows Pearson correlation for planning constrains and students' competence

development. The coefficient was 0.51, Significance stood at 0.00, leading to a significance level of 0.01 (2-tailed). N represents the sum of participants (teachers). To calculate the coefficient of determination (r^2), Pearson correlation coefficient stands at 0.26, $(0.51)^2$=0.21. 0.26(100), the result is 26.00. This 26% variance value indicates that, 26% of the variance in the dependent variable (students' professional development) has as cause the independent variable (planning constraints). In this case, 26% of the variance in students' professional development is explained by planning constraints. This is a two tailed significance and bidirectional correlation case. This means that 26% of the variance in planning constraints is influenced by students' professional development.

In this case, there is a significant relationship between the planning constraints of ICT program and students' professional development in TTCs. With this, hypothesis four (4) is confirmed.

6.3.5. Summary of the ICT program planning variable and students' competence development.

Table 35: Summary presentation of the mean(s) and standard deviation of the statistics on qualities

Descriptive Statistics			
	Mean	Std. Deviation	N
Planning norms	16.59	.801	417
Planning process	19.09	.831	417
Planning context	16.40	1.116	417
Planning constraints	19.10	.833	417
Students' Professional development	15.61	1.282	417

Table 35 shows the summary of mean of planning norms at 16.59, of planning process at 19.09, planning contexts at 16.40, and planning constraints at 19.10 against 15.61 for answers on students' professional development for 417 participants. A summary standard deviation of 0.80 for planning norms, 0.83 for planning process, 1.11 for planning context, and 0.83 for planning constraints, against 1.28 for students' professional development shows that a majority of the scores were close to the mean.

Table 36: Summary of all the correlations from respondents

Correlations						
		Planning norms	Planning process	Planning context	Planning constraints	Students Professional development
Planning norms	Pearson Correlation	1	-.235**	.615**	-.236**	.127**
	Sig. (2-tailed)		.000	.000	.000	.010
	N	417	417	417	417	417
Planning process	Pearson Correlation	-.235**	1	-.131**	.688**	.152**
	Sig. (2-tailed)	.000		.008	.000	.002
	N	417	417	417	417	417
Planning context	Pearson Correlation	.615**	-.131**	1	-.145**	.403**
	Sig. (2-tailed)	.000	.008		.003	.000
	N	417	417	417	417	417
Planning constraints	Pearson Correlation	-.236**	.688**	-.145**	1	.509**
	Sig. (2-tailed)	.000	.000	.003		.000
	N	417	417	417	417	417
Students' Professional development	Pearson Correlation	.127**	.152**	.403**	.509**	1
	Sig. (2-tailed)	.010	.002	.000	.000	
	N	417	417	417	417	417

**. Correlation is significant at the 0.01 level (2-tailed).

Table 36 shows a summary of Pearson correlation for planning norms, planning process, planning context, and planning constraints and students' professional development, which had a coefficient of 0.13, 0.15, 0.40, and 0.51 with significance levels of all 0.10, 0.002, 0.000, and 0.000 respectively. These let to a summary significance level of 0.01 (2-tailed) for planning norms, planning process, planning context, and planning constraints (all the variables). N represents the sum of participants (teachers). Coefficient of determination (r^2) was calculated at 0.2 respectively for planning norms and planning process, 0.16 for planning context and 0.25 for planning constraints. The 02% variance value shows that, 02% of the variance in the dependent variable (students' professional development) has as cause the independent variables of planning norms and planning process respectively, 16% for planning context, and 25% for planning constraints. In this case, 02% of the variance in students' professional development is explained by planning norms and planning process respectively,

16% by planning context, and 25% by planning constrains. These are cases of two tailed significance with a bidirectional correlation. This explains the fact that 02% of the variance in planning norms and planning process respectively, 16% in planning context, and 25% of the variance planning constraints are significantly influenced by students' professional development.

In this case, it can be said that there is a significant relationship between the planning norms, planning process, planning context, and planning constrains of ICT program in TTCs and students' professional development. This confirms the main hypothesis which states that educational policy planning of ICT program significantly influences students' professional development.

6.4.0. PRESENTATION OF QUALITATIVE DATA COLLECTED FROM INTERVIEW

This section presents data obtained from the interview process of data collection. Data obtained from the respective respondents are rated in percentages, taking into consideration similarities and differences.

6.4.1. FINDINGS OF STRUCTURED INTERVIEW

This section presents the summary of the findings of structured interview on the impact of planning ICT program on students' professional development which took place from the May 2021 to October 2021(5) months. Due to the fact that participants were found in 5 different regions of Cameroon, direct contact, indirect contact and WhatsApp were used as a medium of communication, collection and exchange between the interviewees and the researcher. Research assistants were trained to help conduct interviews in Regional Delegation of Far North, Regional Delegation of South West, Regional Delegation of North West, and Regional Delegation of West due distance and insecurity. WhatsApp responses took the form of text messages, video calls and audio calls. The researcher went to the Regional Delegation of Centre for about three different occasions to interview participant since it was accessible to her. Five Regional Coordinating inspectors in charge of Computer science in the teacher training and one National inspector were interviewed. Responses gotten here were used for qualitative information to reinforce data collected through survey. The structured interview gave the researcher an opportunity to collect in-depth feedback through expressing their view points as they discussed and expanded understanding of the different concepts under study.

Therefore, giving a better understanding to the findings from the questionnaire. Qualitative data was exploited under the following five themes:

PRELIMINARY INFORMATION

Theme 1: Planning ICT program and students' competence development

Questions:

1. What do you know about the 2013 ICT teacher training program?
2. What do you think is professional Development?
3. How do you think the ICT program in the teacher training college has influence professional development of student teachers?
4. What can you say as concerns the planning of the ICT program?

From the various brief explanation of the terms 2013 ICT teacher training program, professional Development and planning of the ICT program postulated by the different respondent at least 5 out of the six respondent have an understanding of the concepts giving a percentage of 83.33% for the idea of It is all about equipping student teachers with knowledge and skills in ICTs and equally encouraging them to teach ICT in the nursery and primary schools in future and that It is designing a plan to ensure effective acquisition of basic notions of ICTs by student teachers of Primary teacher training Colleges except one respondent that is 16.66% whose explanation was not well comprehended.

It can be determined from all five respondents that they do have an understanding of the concepts. Thus, the understanding of that concept stands at 80%; even though with varied explanation; The process of nurturing an individual so much so that he or she possesses a level of competence in the practice and use of ICT. This program is aimed at developing professionalism in student through the use of ICTs making them to be highly performant, reflective and open to the world.

All six respondent shares the view that ICT teacher training program can influence professional Development us a 100%. Looking at their diverse reasons as to how; With the teaching of this practical subject call ICT, many students are now able to apply the knowledge acquired in using ICTs. They can effectively use traditional tools like gongs, drum etc. to pass information while those in the towns use sophisticated/ multimedia modern tools like laptops, multimedia phones etc. to teach their lessons. Students by the end of the Teacher training

course have to go through ICT and Didactics of Educational Technologies. They are required to master the content of the subjects and go a long way to do practical.

Theme 2: Planning Norms and students' competence development in ICTs.

Questions:

5. How are some laws (for example the 1998 law of education) used in planning ICT program so as to foster student teacher's knowledge?
6. Why is there need to insist on the demonstration of mastery when planning ICT program in the teacher training colleges?
7. What assessment methods should be used to dictate students' performance and skills development when planning ICT program in the teacher training college
8. What external instruments should be considered in planning ICT programs in teacher training colleges that help student teachers to develop skills?

Some 70% of the participants share the view that planning norms affect students' professional development in ICTs. The norms in question imply some laws, the demonstration of mastery, assessment methods, and external instruments. Although the different participants have their explanation as to what methods should be considered and how planning norms affect students' professional development in ICTs; but they had common points running through their different responses like: assessment in a practical discipline like ICTs should take the form of practical. According to them if assessment takes the form of hands on especially in the computer laboratory, then much knowledge, skills and academic performance would be achieved. Moreover, they were unanimous on the point that guidelines laid down by UNESCO and U.N.O should be used to plan Teachers training program on ICT in Cameroon.

The first group of participants asserted that planning norms are like setting the ball running: - setting the channel through which the ball will roll and setting the place to which the ball will go to. If planning norms are not well spelled out then there will be no success in planning. Elaborated principles on how teaching, learning and evaluation should take the forms of theory and practical. Practically, they must demonstrate mastery in operating basic ICT devices used in teaching by effectively integrating them to teach lessons during teaching practice. Practical assessment methods will cause student teachers to be able to demonstrate skills and mastery of content. When these skills and content are achieved then professional development is acquired.

Theme 3: Planning process and students' competence development in ICTs.

Questions:

9. What aspects of societal needs should be diagnosed when planning ICT program in teachers training colleges aimed at improving students' knowledge, skills and academic performance?
10. What evaluation procedures should be considered when planning ICT programs in teachers training colleges that foster student's professional development?
11. How should monitoring be carried out when planning ICT programs in teacher training colleges in order to influence students' professional development?
12. What implementation strategies should be highlighted when planning ICT program geared at building student teachers' skills?

Findings

Although the different participants have their methods as to how the different planning process can influence students' professional development in ICTs, but they had common points running through their different responses like; Practical teaching, supervision, feedback and modification as implementation strategies to be used in planning ICT in Teacher Training Colleges, that the content and methods of the ICT in Teacher Training College should have international standard. They also insisted that evaluation should be frequently carried out and it is on that note that they talked of formative and summative evaluation. That the program should insist on pilot testing of all steps of the program before real implementation in the classroom and that educational planners should consider the scientific changes over time when planning an ICT program.

All six respondents hold to the fact that societal needs, evaluation procedures, monitoring, implementation strategies can influence professional development, thus giving us a that there should be well equipped computer laboratories to ensure ICT should be done practically than theoretically, Monitoring should be throughout the implementation of the subject ICT in teacher training Colleges and that monitoring of ICT programs should be done through inspection exercises, ICT gadgets and inspection forms to be filled. Evaluation must follow what the students know and what they can do in other words; it should follow the Competence Based Approach. Written evaluation and evaluation in the computer laboratory

and even through the internet should be practiced and finally that our natural resources in the community should be of great concern.

Some of the advanced ways as to how different aspect of the planning process (societal needs, evaluation procedures, monitoring, implementation) can influence students' professional development are as follows: Practical skills on how to manipulate the computer is gained when working in computer laboratories to achieved simple and complex tasks, Knowledge on computer contents such as traditional tools of communication, types of computers, the use of the internet in research, computer components (software and hardware) are gained by the student teachers. That as concerns Didactics of Educational Technologies students is equipped with methods, principles and techniques on how to teach ICTs in the nursery and primary schools. The learning of ICTs helps students to ameliorate their academic performance in other subjects since they are taught the methods to carry on research using the internet. The subjects- ICT and Didactics of Educational Technologies in addition improve students' academic performance and builds up competences.

Theme 4: Planning context and students' competence development in ICTs.

Questions:

13. Why should financial issues be considered in planning ICT programs with the aim of having an influence on students' knowledge?
14. How do socio-political issues influence the planning of ICT program?
15. Why do you think health should be considered when planning ICT programs in teachers training colleges and what is its effect on professional development?
16. Explain how the different resources (human, material, etc.) can influence the planning of ICT planning in teachers training colleges and what consequences does it have with student's professional development?

Findings

An 80% of the participants share the view that planning context affects students' professional development in ICTs. The context in question implies financial, socio-political factors, health situation and the nature of resources (quality and quantity). Although the different participants have their reasons as to why planning context affects students' professional development in ICTs; but they had common points running through their different responses like: Finance is the resource that determines the human and material resources such the training of teachers and equipping of computer laboratories. Finance is determined at all

stages such as planning, implementation, monitoring and evaluation. If care is taken such that the health of students and teachers is less stressful, then they will likely implement the curriculum with ease and therefore remarkable students' skills will be achieved.

The first group of participants asserts that any political atmosphere that is full of peace and security will favor ICT program and consequently professional development of student teachers. The other two respondents are insisting that laws and regulations should be formulated which will favor the planning of ICT program in teacher training colleges. Human resources like teachers need to be able to impart knowledge to the learners to influence their professional development. Material resources like computer laboratories and internet services are required to influence learner's professional development. The third respondent says if there are no experts to manage the gadgets, problems arise. According to him ICT tools should come with expert's knowledge.

Theme 5: Planning constraint and students' competence development in ICTs.

Questions:

17. What are some environmental conditions that can influence student teacher knowledge which should be taken note of when planning ICT programs in teachers training colleges?
18. What nature of the organization affects skills development of student teachers that must be considered when planning ICT programs in teachers training colleges?
19. What are some strategies/factors that hinder student teacher's academic performance which must be considered when planning ICT programs in teachers training colleges?
20. How should the nature of technologies be considered in planning ICT programs and how can it affect student's professional development?

Findings

A 100% of the participants share the view that planning constraint affect students' professional development in ICTs. The following points were raised to support the fact: -. Extreme temperatures (hot and cold) and remoteness of an area has a positive relationship to students' acquisition of skills and knowledge in ICT. Harsh climatic conditions can cause a machine that formally was working not to work very well. To this, this decentralized system of organization and bureaucracy will positively affect implementation and learning of ICT studies in student teachers. Participants admitted that if Content of ICT as a subject is logically

arranged to follow sequence that is from simple to complex, from concrete to abstract then professional development of student teachers will be motivated. Moreover, the use of mechanical (traditional) together with modern ICT gadgets and the use of One student, one computer one computer, face to face alongside online lessons, individual and group work approaches is suggested. All these will go along to influence learners' performances.

Responses of all six participants illustrate that professional development can be positively or negatively influence by planning constraint. Some of the reasons postulated by respondents shows that Environment with steady supply of electricity and network stability have high probability to increase students desire for knowledge since they will not be disappointed at the computer library at any one time. Also, if representative(participatory) planning with all stake holders in the society working together is considered then student teachers will benefit more between strategizing practical activities with the teaching and learning of ICT programs operate in the same line with student's professional development. When electricity and network supply especially in rural areas are well managed and the classroom adapted to effective teaching and learning of ICTs the result be positive in the side of learners. The last group of respondents shares the view that determining the weight and size of the gadget vis a vis their location and usage is a powerful resource.

6.5. SUMMARY REPORT ON STRUCTURE INTERVIEW (FINDINGS)

Discussions on the structured interview will examine the extent to which the planning ICTs program affects professional development of student teachers with regards to outlines such as planning norms, process, context and constraint as well as students' academic performance, knowledge, skills and competence. The interview was carried out under five overarching themes wherein the different views and expressions of participants were presented in the context of planning ICT program and students' professional development.

Planning norms, planning process, planning context, and planning constraint of ICT program and variables of student teachers' professional development (Knowledge, skills, abilities, and competences). The structured interview was carried out for five months successfully with regards to participant that were inaccessible to the researcher. Those areas that were accessible to the researcher such as the Regional Delegation of Centre region and at the Ministry of Secondary Education for about three different occasion to complete the interview of five themes. The sample was made up of 5 regional coordinating pedagogic inspectors in charge of Computer science in the teacher training and one National Inspector at

the Ministry of Secondary Education that is, one participant each from the selected regions that constituted the sample.

6.5.1. Theme 1: Planning ICT program and students' competence development

Majority of the respondents agreed that planning ICT program involves laying down guidelines of the 2013 ICT Teachers training program in the teacher training colleges that was geared towards students to master both practical and theoretical parts of Information and Communication Technologies.

In my own opinion, it is a design that consists of Information and Communication technologies and Didactics of Educational Technologies that is geared towards imparting student teachers with competence to meet new challenges in the society. Also learning about ICTs, learning with ICTs, and learning with ICTs puts the learner at the centre of the teaching/learning process. It enhances understanding and mastery which fosters professional development.

Most of them explained that professional development is the continuous process of nurturing an individual so much so that he or she possesses a level of knowledge and skills that enables he or she to practice a profession without difficulties.

To me, Professional development in this context is the acquisition of the knowledge and skill needed in a profession that enables the individual to plan, present lessons and manage the classroom effectively.

All participants accepted that Planning ICT program can influence students' professional development. Implicitly, their responses show that ICT program positively influence professional development. In their responses, they expressed that the ICT program improves skills in teaching and evaluation, opens the student teachers mind and reinforces their capacity.

To the researcher, ICT program can positively influence professional development. It gives the student teachers an opportunity to have basic and advanced knowledge on traditional as well as modern ICTs and at the same time develop skills of using them in teaching, learning, research and evaluation. Knowledge of ICTs like the internet, computers, projector cause student teachers to upgrade their understanding about teaching in the 21st century.

6.5.2. Theme 2: Planning norms and students' competence development in ICTs.

A majority of participants accepted that planning norm (Educational laws, demonstration of mastery, assessment methods, and external instruments) refers to conditions dictated by the superior authority as to the functioning of the ICT program. These conditions direct the program on proper functioning for example they agreed that principles elaborated by external organizations like UNESCO and UN go a long way to make the ICT program to function effectively.

In my own opinion planning norms refers to lay down rules regarding the functioning of the ICT program. They are external forces that direct the conception, implementation and evaluation of the program. For example, the educational law of 1998 encourages students to be deeply rooted in their culture and open to the world. The Cameroon law of Education of 1998 therefore acts as a planning norm of the ICT program.

All of the participants hold to the fact that planning norms with respect to the ICT program can influence professional development of student teachers. Planning norms permit the use of Standardized measures which have succeeded in other countries, it helps student to successfully compete with other students, master and overcome the societal demands and causes student teachers to be more knowledgeable as he does not only relay on printed materials which can even be faulty.

To me, planning norms with respect to the ICT program can influence professional development of student teachers. This is because *as teachers, there is a wide avenue to select appropriate didactic materials that can be used in teaching. These materials can be audio visuals, text, printed that the student teachers not only use them to teach but also learn with, and consequently improves his or her professional output. In the area of evaluation, student teachers embrace better assessment tools for evaluation with high validity and reliability index.*

6.5.3. Theme 3: Planning process and students' competence development in ICTs.

Most of the respondents hold that planning process (societal issues, evaluation procedure, monitoring, and implementation strategies) of the ICT program refers to steps taken to achieve objectives. There are planning aspirations are developed into visions which is later transformed into missions to be accomplished.

To the researcher, planning process as it concerns societal issues, evaluation procedure, monitoring and implementation strategies are all the requirements introduced either by the internal forces or external forces necessary for the success of the ICT program.

In this study planning process was contextualised into four areas taking into consideration the societal issues, evaluation procedure, monitoring and evaluation strategies considering the unique characteristics and priorities of the beneficiaries and the program.

Respondents all agreed to the fact that planning process (societal issues, evaluation procedure, monitoring, and implementation strategies) influence professional development of student teachers. According to them continuous follow up by inspectors- Regional like National will go a long way to ensure that the program actually meet its objectives that of ensuring students are inculcated with ICT skills. In addition, diagnosing the needs of the society in developing a program will enable the program to centre on the learner. When programs are learner centered, skills and knowledge will be achieved consequently professional development of student teachers.

In my own opinion, planning process can influence professional *development in that when planning is centered on societal values and culture, student will benefit better because the program involves their daily lives. They benefit from more knowledge and skills from the program if they fine the program stages at their reach and less complex consequently ameliorating their professional development.*

6.5.4 Theme 4: Planning context and students' competence development in ICTs.

From the responses of majority of the participants, planning context has to do with considering present day aspects in planning the ICT program which does not depend on external forces. These aspects involve financial issues, socio-political issues, health issues, and available resources in the society. According to them financial considerations must be made because no program can be effectively implemented without money to provide equipment, manuals, training of implementers and conducive environment. Money is required at all stages: -planning, implementation, monitoring and evaluation.

To me, context of ICT program planning involves the contemporary state of affairs in the environment at the time that the program is being developed. The current issues in Cameroon today that affect planning of ICT programs for teacher training colleges can be examined under financial issues, socio-political issues, health issues, and available resources.

Respondents all agreed to the fact that planning context influence professional development of student teachers. That if money is available at all stages ranging from planning to evaluation, it will ensure that students have adequate materials to be taught and to learn with and consequently improved academic performance will be guaranteed.

In my opinion, planning context influence professional development of student teachers if we consider financial, socio-political and health issues and available resources in a country. If finance is adequately planned for, then implementation would be more of practice than theory. The more students and teachers *practice using ICT tools, the more skills are acquired to teach and learn with. Skills are proofs that learning took place and the skills can then be used by students' teachers to teach younger pupils in the primary schools.*

6.5.5 Theme 5: Planning constraint and students' competence development in ICTs.

All of the respondents agreed to the fact that planning constraints such as the nature of technologies, strategies, organization effect and environmental conditions are the challenges that must be considered when planning ICT program.

To the researcher, planning constraints refers to a general condition of difficulties faced during the implementation of the ICT program and can impede the smooth functioning of the program.

A majority of the respondents agreed that planning constraints such as the nature of technologies, strategies, organization effect and environmental conditions influence students' professional development.

To the researcher, that planning constraints such as the nature of technologies, strategies, organization effect and environmental conditions influence students' professional development.

6.6.0. CONCLUSION

This chapter has presented an analytical presentation of data and findings. Also, the respective sections of the research report present the findings obtained from the field and their analyses. This is done by using percentages, tables, graphs and charts, and frequency, exploiting correlation. The first section presented descriptive analysis of the characteristics used in the study. The second section examined presented interview discussions, and the third section verifies hypotheses. The target population distribution was presented for each variable using the existing demographic information. Also, data collected from teacher trainers was presented, findings of interview exchanges, summary report on interview discussions (findings) were presented respecting the respective themes (planning norms, planning processes, planning context and planning constraints and their relationship with student teachers' professional development). Furthermore, the research hypothesis was verified following research hypotheses, and measures ICT program planning and students' professional development were equally analytically discussed.

CHAPTER FIVE
DISCUSSION OF RESULTS, RECOMMENDATIONS AND CONCLUSION

7.0. INTRODUCTION

This chapter focuses on discussing the results obtained as well as interpreting it based on the quantitative and qualitative perspectives and make recommendations that would ameliorate the phenomenon, then present suggestions that will help future researchers and further research in the domain.

7.1.0. SUMMARY OF FINDINGS

The study was aimed at investigating the educational policy planning of ICT program variables that influence students' professional development.

Four research hypotheses were formulated to guide the researcher. realise this study: A questionnaire and an interview guide were the main research instruments used. Data were collected and analyse using Pearson correlation with mean and standard deviation included. From the analyses done the following were obtained:

1. ICT program planning norms significantly affect students' professional development in TTCs.
2. ICT program planning process significantly influences students' professional development in TTCs
3. ICT program planning context significantly affects students' professional development in TTCs
4. ICT program planning constraints significantly influence students' professional development in TTCs

7.1.1. Summary findings according to research questions

Research Question 1: To what extent does ICT program planning norms affect students' competence development in teacher training colleges?

There exist correlational relationships between characteristics of planning norms and students' professional development in teacher training colleges. The findings show that on the average gotten from teachers' responses shows that students' professional development has 02% of its variance explained by planning norms and vice versa. Though it is low but it is significant. This means that 02% of the variance in planning norms is influenced by students'

professional development as well as professional development also influences planning norms. Therefore, characteristics of planning norms namely; national instruments, goals, assessment methods, and international instruments are influential on students' professional development elements of students' knowledge construction, skills development, academic performance, and competencies. It can therefore be stated that, there is a significant correlational relationship between planning norms and students' professional development. Therefore, research question one (1) is answered.

Findings of interview exchanges or discussions ICT program planning in TTCs with respect to national norms, with diverse views the respondents with an 80% majority rate acknowledged that ICT program planning in TTCs respect national norms. Responding to the questions on the respect of national goals of ICT program in TTCs ICT program planning, all the participants in at a 100% rate agreed. Also, at 80% rate, the respondents to the interview guide acknowledged that assessment methods are being taken into consideration during planning of ICT program for TTCs making it relevant to professional development. The interviewees though with divergent views agreed that international instruments should be taken into consideration in the course of planning ICT programs for teacher training colleges. Therefore, the interviewees collectively held the point of view that planning norms of ICT program greatly influences students' professional development in teacher training colleges.

Therefore, it can be stated that there is a significant correlational relationship between the planning norms of ICT program and students' professional development is the results gotten from the findings of both survey and interview. These findings collectively confirm research question one (1).

Research Question 2: Does ICT program planning process affect students' competence development in teacher training colleges?

There exists a correlational relationship between features of planning process and students' professional development in teacher training colleges. The results obtained from the findings show that on the average gotten from teachers' responses, students' professional development has 02% of its variance explained by planning process and vice versa. Though it is low but it is significant. This means that 02% of the variance in planning process is influenced by students' professional development as well as professional development also influences the planning process. Therefore, characteristics of planning process namely; diagnosis, implementation, monitoring and evaluation are influential on students' professional

development elements of students' knowledge construction, skills development, academic performance, and competency development. It can therefore be stated that, there is a significant correlational relationship between planning process and students' professional development. This confirms and answers research question two (2).

In the course of the interview sessions, a majority of 80% of the interviewees hold that the view that diagnosis at the planning stage of ICT program for TTCs play a great role in students' professional development. Findings of interview exchanges or discussions ICT program planning in TTCs with respect to planning process, with diverse views the respondents with a simple majority of 60% rate acknowledged that ICT program planning process in TTCs influence student's professional development. Responding to questions on monitoring in the planning of ICT programs for TTCs all the interviewees at a 100% rate agreed that it was essential in stimulating students' professional development. Also, at 100% rate, the respondents to the interview guide acknowledged that evaluation of the ICT program for TTCS planning process significantly impact students' professional development. Therefore, it can be concluded that on an absolute majority the interviewees collectively asserted to the view that the planning process of ICT program greatly influences students' professional development in teacher training colleges.

Therefore, it can be stated that there is a significant correlational relationship between the planning process of ICT program and students' professional development is the results gotten from the findings of both survey and interview. These findings collectively confirm research question two (2).

Research Question 3: To what extent does ICT program planning context affect students' competence development in teacher training colleges?

There is existence of a correlational relationship between characteristics of planning context and students' professional development in teacher training colleges. The results obtain from the findings show that on the average gotten from teachers' responses that students' professional development has 16% of its variance explained by planning context and vice versa. This means that 16% of the variance in planning context is influenced by students' professional development as well as professional development also influences the planning context. Therefore, characteristics of planning context namely; financial issues, Socio-political issues, health issues, and resources are influential on students' professional development elements of students' knowledge construction, skills development, academic performance, and

competency development. It can therefore be stated that, there is a significant correlational relationship between planning context and students' professional development. This confirms and answers research question three (3).

Therefore, there is a significant correlational relationship between the didactic quality of multimedia-based pedagogy program and students' professional development is the conclusion arrived at from findings of both survey and focus group discussion. These findings entirely confirm research question three (3).

Findings of interview exchanges or discussions ICT program planning in TTCs with respect to financial issues, with diverse views the interviewees at a 100% absolute majority rate acknowledged that ICT program planning in TTCs is influence by financial issues which in return affect student's professional development. Responding to the questions on the role of socio-political issues on ICT program planning in TTCs, the participants at an 80% rate agreed that socio-political issues of the country has influence on ICT program planning. Also, at 80% rate, the respondents to the interview guide acknowledged that health issues play a great role in planning of ICT program for TTCs making it relevant to professional development. The all interviewees though with divergent views agreed that resources ranging from human, financial and material are some of the factors that influence ICT program planning for TTCs that subsequently affect professional development in student teachers. Therefore, the interviewees once again collectively held the point of view that planning contexts factors of ICT program planning greatly influences students' professional development in teacher training colleges.

Therefore, it can be stated that there is a significant correlational relationship between the planning context of ICT program and students' professional development is the results gotten from the findings of both survey and interview. These findings collectively confirm research question three (3).

Research Question 4: Does ICT program planning constraints affects students' competence development in teacher training colleges?

There exist correlational relationships between characteristics of planning constraints and students' professional development in teacher training colleges. The findings show that on the average gotten from teachers' responses that students' professional development has 26% of its variance explained by planning constraints and vice versa. Though it is low but it is significant. This means that 26% of the variance in planning norms is influenced by students'

professional development as well as professional development also influences planning constraints. Therefore, characteristics of planning constraints namely; the environment (urban and rural), organisation, strategies, and technology are influential on students' professional development elements of students' knowledge construction, skills development, academic performance, and competencies. It can therefore be stated that, there is a significant correlational relationship between planning constraints and students' professional development. Therefore, research question four (4) is answered.

Findings gotten from the interviewees during the respective exchange sessions on ICT program planning in TTCs with respect to context, showed that though with divergent views the interviewees at a 80% absolute majority rate acknowledged that ICT program planning in TTCs is influence by the context which in return affect students professional development. Also, at 80% rate, the respondents to the interview guide acknowledged that health issues play a great role in planning of ICT program for TTCs making it relevant to professional development. The all interviewees though with divergent views agreed that organisational factors influence ICT program planning for TTCs, which in return affect students' professional development. Responding to the questions on the role of technological consideration in ICT program planning in TTCs, the participants at an 80% rate agreed that technological considerations greatly influences TTCs ICT program planning. Therefore, the interviewees again collectively on the bases of an absolute majority held the point of view that planning constraints factors of ICT program greatly influences students' professional development in teacher training colleges.

Therefore, it can be stated that there is a significant correlational relationship between the planning constraints of ICT program and students' professional development is the results gotten from the findings of both survey and interview. These findings collectively confirm research question four (4).

7.1.2. Summary findings according to hypotheses

The following alternative hypotheses were used in the research work used:

Research Hypothesis 1: ICT program planning norms significantly affect students' competence development in TTCs.

The SPSS version 26 was used in doing data analysis on planning norms of ICT program and students' professional development in teacher training colleges. Pearson Product-moment correlation coefficient (r) according to Pearson correlation for planning norms and

students' competence development, had a coefficient of 0.13, significance stood at 0.10, therefore a significance level of 0.01 (2-tailed). We therefore, scientifically reject the null hypothesis (Ho) (The ICT program planning norms has no significant influence on students' professional development) and therefore retained the alternative hypothesis (Ha). Therefore, ICT program planning norms has a significant influence on students' professional development.

This conclusion is supported by findings of interview exchanges or discussions. Findings of interview exchanges or discussions ICT program planning in TTCs with respect to national norms, shows that with diverse views the respondents with an 80% majority rate acknowledged that ICT program planning in TTCs respect national norms. Responding to the questions on the respect of national goals of ICT program in TTCs ICT program planning, all the participants in at a 100% rate agreed. Also, at 80% rate, the respondents to the interview guide acknowledged that assessment methods are being taken into consideration during planning of ICT program for TTCs making it relevant to professional development. The interviewees though with divergent views agreed that international instruments are taken into consideration in the course of planning ICT programs for teacher training colleges.

Therefore, the interviewees collectively held the point of view that planning norms of ICT program greatly influences students' professional development in teacher training colleges. Therefore, null hypothesis (Ho) is scientifically rejected and the alternative hypothesis (Ha) scientifically retained. Therefore, ICT program planning norms has a significant influence on students' professional development in teacher training colleges, as shown by both the survey analysis and interview findings.

Research Hypothesis 2: ICT program planning process significantly influences students' competence development in TTCs

The Pearson Product-moment correlation (r) for planning process and students' professional development in teacher training colleges, resulted in a coefficient of 0.15, and significance stood at 0.02, resulting in a significance level of 0.01 (2-tailed). Therefore, the null hypothesis (Ho) (ICT program planning process has no significant influence on students' professional development) is rejected while statistically retaining the alternative hypothesis (Ha). Therefore, ICT program planning process has a significant influence on students' professional development in TTCs.

This result is further confirmed by findings from interview. In the course of the interview sessions, a majority of 80% of the interviewee hold that the view that diagnosis at the planning stage of ICT program for TTCs are play a great role in students' professional development. Findings of interview exchanges or discussions ICT program planning in TTCs with respect to planning process, with diverse views the respondents with a simple majority of 60% rate acknowledged that ICT program planning process in TTCs influence student professional development. Responding to questions on monitoring in the planning of ICT programs for TTCs all the interviewee at a 100% rate agreed it was essential in stimulating students' professional development. Also, at 100% rate, the respondents to the interview guide acknowledged that evaluation of the ICT program for TTCS planning process significantly impact students' professional development.

Therefore, it can be concluded that on an absolute majority the interviewees collectively asserted to the view that the planning process of ICT program greatly influences students' professional development in teacher training colleges. The null hypothesis (Ho) is with respect to interview findings rejected while these findings retain the alternative hypothesis (Ha). Therefore, ICT program planning process has a significant influence on students' professional development in teacher training colleges as shown by both the survey analysis and interview findings.

Research Hypothesis 3: ICT program planning context significantly affects students' competence development in TTCs

The Pearson Product-moment correlation (r) for ICT program planning context and students' professional development in TTCS, had a coefficient of 0.40, significance stood at 0.00, resulting in a significance level of 0.01 (2-tailed). Therefore, scientifically the null hypothesis (Ho) (ICT program planning context has no significant influence on students' professional development in teachers training colleges) is rejected and the alternative hypothesis (Ha) is retained. Therefore, ICT program planning context has a significant influence on students' professional development.

The survey result is strongly reinforced interview exchange findings. Findings of interview exchanges or discussions ICT program planning in TTCs with respect to financial issues, with diverse views the interviewees at a 100% absolute majority rate acknowledged that ICT program planning in TTCs is influence by financial issues which in return affect student's professional development. Responding to the questions on the role of socio-political issues on

ICT program planning in TTCs, the participants at an 80% rate agreed that socio-political issues of the country has influence on ICT program planning. Also, at 80% rate, the respondents to the interview guide acknowledged that health issues play a great role in planning of ICT program for TTCs making it relevant to professional development. The all interviewees though with divergent views agreed that resources ranging from human, financial and material are some of the factors that influence ICT program planning for TTCs that subsequently affect professional development in student teachers.

Therefore, the interviewees once again collectively held the point of view that planning contexts factors of ICT program planning greatly influences students' professional development in teacher training colleges. Therefore, the findings from the interview reject the null hypothesis (Ho) and retain the alternative hypothesis (Ha). Therefore, ICT program planning context has a significant influence on students' professional development in teacher training colleges, as indicated by both the survey analysis and interview findings.

Research Hypothesis 4: ICT program planning constraints significantly influence students' competence development in TTCs

The Pearson Product-moment correlation for ICT program planning constraints and students' professional development in teacher training colleges, had a coefficient of 0.51, significance stood at 0.00, resulting a significance level of 0.01 (2-tailed). In this light, the null hypothesis (Ho) (ICT program planning constraints has a no significant influence on students' professional development in teacher training colleges) is rejected while retaining based on findings obtained the alternative hypothesis (Ha). Therefore, ICT program planning constraints has a significant influence on students' professional development in teacher training colleges.

Interview findings on gives an in-dept to the above conclusions. Findings gotten from the interviewees during the respective exchange sessions on ICT program planning in TTCs with respect to context, showed that though with divergent views the interviewees at a 80% absolute majority rate acknowledged that ICT program planning in TTCs is influence by the context which in return affect students professional development. Also, at 80% rate, the respondents to the interview guide acknowledged that health issues play a great role in planning of ICT program for TTCs making it relevant to professional development. The all interviewees though with divergent views agreed that organisational factors influence ICT program planning for TTCs, which in return affect students' professional development. Responding to the questions on the role of technological consideration in ICT program planning in TTCs, the

participants at a 80% rate agreed that technological considerations greatly influences TTCs ICT program planning.

Therefore, the interviewees again collectively on the bases of an absolute majority held the point of view that planning constraints factors of ICT program greatly influences students' professional development in teacher training colleges. The null hypothesis (Ho) is rejecting based on interview findings while the alternative hypothesis (Ha) is retained. Therefore, ICT program planning constraints program has a significant influence on students' professional development in teacher training colleges, as shown by the survey analysis and interview findings.

7.2.0. DISCUSSION OF RESULTS

This part focused on the hypotheses of the study and the findings established. The main purpose of this study was to investigate the educational policy planning of ICT program and its relationship with students' professional development in teacher training colleges (TTCs) in Cameroon. The variables used were planning norms, planning process, planning context and planning constraints. Below is a discussion of the hypotheses formulated.

7.2.1. ICT program planning norms significantly affects students' competence development in TTCs.

Findings showed that ICT program planning norms significantly influences students' professional development in teacher training colleges. Pearson correlation for ICT program planning norms and students' professional development in teacher training colleges had a coefficient of 0.13. Significance stood at 0.010, leading to a significance level of 0.01 (2-tailed). A coefficient of determination (r^2) of 0.2, 02% variance value shows that 02% of the variance in the dependent variable has as cause the independent variable as well as the independent variable on the dependent variable.

This result is in accordance with findings of interview exchanges. Findings of interview discussions on ICT program planning in TTCs with respect to national norms, with diverse views the respondents with an 80% majority rate acknowledged that ICT program planning in TTCs respect national norms. Responding to the questions on the respect of national goals of ICT program in TTCs ICT program planning, all the participants in at a 100% rate agreed. Also, at 80% rate, the respondents to the interview guide acknowledged that assessment methods are being taken into consideration during planning of ICT program for TTCs making it relevant to professional development. The interviewees though with divergent views agreed

that international instruments are taken into consideration in the course of planning ICT programs for teacher training colleges.

This result is in conformity with articles 43 and 45, of the revised 1996 constitution of the Republic of Cameroon states very clearly that the constitution is the main law from which legal instruments are made. It is the constitution that gives authority from which international instruments are ratified, planned and applied especially in the Cameroonian educational system (Nyansi, 2014). Furthermore, the results affirm that the main law that guides education at the elementary, secondary and teacher training level in Cameroon is law No 98/004 of 4th April 1998 (Akemche, 2014). This law also known as the law of orientation lays down the general framework of educational norms as well as planning in Cameroon. Therefore, section 5/1 one of the purposes of education in Cameroon is to train the learners to be deeply rooted in their culture but open to the world is serious taken into consideration in the planning of ICT programs for teacher training colleges. That is why ICT became an integral subject in the teacher training colleges in 2007, and Educational technology to accompany the students with the didactics of ICT for professional development purposes.

The findings from the interview discussions show that respondents with divergent views an average of about 90%, accepted that planning norms are taken into consideration when planning ICT programs for teacher training colleges which in return influence students' professional development. This result is in line with Akintson (2011) who states that rationality planning on comprehensive rationality of which the 'centre' is so influential to cause a policy change through decision making of and individual, a core-executive, or a governing organisation. This is in confirmity with Josue (2007) who holds that ICT program introducation in Cameroonian schools was the sole decision of the head of state.

Furthermore, this assertation is supported by Akintson (2011) who affirm that the comprehensive rationality model is constructed base on the following assumptions: saparation of values from facts when research in policy by policymakers identifying their aims or goals and organisation assessing the best means to attain these aims or goals; there should be consistancy in policy preferences ranking them to facilitate maximising social or educational gain; the linear nature of policy making should be respected by identifying policy aims from value perspective (identification), means of achieving them (making decision), and selecting the best means in achieving them(implementation). These elements are considered during the planning of ICT program for teacher training colleges so as to ensure construction of

knowledge, development of ablities, skills, aptitude and competencies for effective professional development.

Pearson correlation for ICT program planning norms and students' professional development in teacher training colleges had a coefficient of 0.13, and a significance of 0.01. this is in accordance with Edri, (2004) who carried out a study on planning and teachers' practices. This study explored the planning processes among teachers integrating ICT, its impact on implementation, and the relation between teachers' planning patterns and school planning patterns. Results show that the school planning policy was found to be strategic, systematic, and participative. Three patterns of planning were found among the teachers: the "flow" pattern, the "flexible" pattern, and the "fulfiller" pattern. Therefore, planning has to be carefully carried out at all stages, in order for it to result in students' effective professional development.

On the other hand, Fabunmi, (2003) studied the Historical Analysis of Educational Policy Formulation in Nigeria: Implications For Educational Planning and Policy. All the educational laws were outlined beginning from the 1882 Education Ordinance to the education laws of 1999-2004 and their implications to educational planning and policy were established. It was revealed that most of the colonial educational policies had the shortcoming of not taking into account our local peculiarities therefore participatory model of planning education and formulating educational policies is the most appropriate for a multi-ethnic nation like Nigeria. Therefore, ICT program planning in Cameroon will be more productive in terms of students' professional development if it were to apply the participatory principles of planning, so as to meet the needs of its multi-ethnic clients.

All these affirmations correlate the positive results obtained on planning norms and its influence on students' professional development in teacher training colleges. These affirmations give positive answers to the first research question; to what extent does ICT program planning norms affects students' professional development in teacher training colleges?

7.2.2. ICT program planning process significantly influences students' competence development in TTCs

The results show that ICT program planning process significantly influences students' professional development in teacher training colleges. Pearson correlation for ICT program planning process and students' professional development in teacher training colleges has a

coefficient of 0.15. Significance stood at 0.002, resulting in a significance level of 0.01 (2-tailed). A coefficient of determination (r^2) of 0.2, therefore 02% of the variance in the dependent variable has as a cause the independent variable. Therefore, 02% of the variance in students' professional development in teacher training colleges is explained by ICT program planning process and vice versa.

This is in conformity with the exchanges and findings of interview, where in the course of the interview sessions, a majority of 80% of the interviewee hold that the view that diagnosis at the planning stage of ICT program for TTCs are play a great role in students' professional development. Findings of interview exchanges or discussions ICT program planning in TTCs with respect to planning process, with diverse views the respondents with a simple majority of 60% rate acknowledged that ICT program planning process in TTCs influence students' competence development. Responding to questions on monitoring in the planning of ICT programs for TTCs all the interviewee at a 100% rate agreed it was essential in stimulating students' professional development. Also, at 100% rate, the respondents to the interview guide acknowledged that evaluation of the ICT program for TTCS planning process significantly impact students' professional development.

The findings of this work is in conformity with Puamau (2006) who affirm that planning process naturally should start at the level of the aspiration of the people and the ministry of education, at this point these aspirations are developed into visions which is later transformed into missions to be accomplished. Then the articulation of goals, objectives, and outcome; accomplishment strategies are put in place with the selection of achievement and performance indicators; timelines are set as well as human, financial and material resources are allocated to programs and their activities; communication of the plan to varies stake holders is done to create awareness; and the plan is implemented and executed, monitored and reviewed if necessity demands, and evaluated using performance indicators. ICT program planning process contains these elements which directly influence students' professional development.

Furthermore, this result is in accordance with the view of Alexopoulou, Batsou, and Drigas (2019) who affirm one of the major technological move or leaps that has taken place in recent years is the invention and the ever-increasing usage of Information and Communication Technology (ICT). They hold that there are a series of reconsiderations to be made during the planning stage of ICT programs. This is explained by the fact that the capabilities of existing computers and ICT devices are questionable when it concerns meeting the needs and

expectations of modern education. However, ICT planning process has the potentials of making provision for ICT tools upgrade scheme that will result professional development.

Furthermore, Lindblom (1959) in Akintson (2011) emphasize strategic analysis in incrementalism that has to do with realistic policymaking strategies which are more often exploited as an alternatives. It also relate to a number of political as well as educational strategies and the intricases of producing policy agreement such as the implemntation of ICT as a subject in Cameroonian teacher training colleges. In incrementalism goals and policies have to selected simultaneously, the alternatives need to be considered marginally different fromstatusquo, alternatives have to be compared and simplified, trust should be focused on social experiment results than theory, repeatedly address the problem to be resolved, planners are required to restrict their attention to a number of relatively few values as well as polices, and planning behaviour should be theorized. The ICT program planning consider and exploit the princples of incrementalism to ensure effective students' professionaldevelopment.

Pearson correlation for ICT program planning process and students' professional development in teacher training colleges with a coefficient of 0.15, a significance stood of 0.002, resulting in a significance level of 0.01 (2-tailed), is in accordance with MINESEC (2013) with respect to ICT and Educational Technology in teacher training colleges state that the goal of these two subjects was to groom student teachers develop competences in computer awareness, such that they can effectively teach ICT and integrate ICT tools to teach all other subjects on the primary school curriculum. These new syllabuses were meant to prepare student teachers with the help of pertinent teaching-learning approach, to integrate in the world and confront a job market that is becoming more and more demanding.

Also, the results are in conformation with UNESCO (2016) affirming that monitoring of educational systems is a global, regional and national issue as it calls for discussions and debate at these levels such as the Dakar Education Forum of the year 2000 and a series of post Dakar educational forums and conferences that have taken place at the regional and national levels. All these is stimulated by the mission to attain global goals in education which has come along with concepts such as; 'access to equitable and quality education for all', 'expanded vision of basic education', and 'lifelong learning'. These missions or goals affect the planning and designing of ICT program monitoring in many countries globally. This is because the paradigms of monitoring planning and implementation have today shifted toward performance based and is more focused on result-oriented outcomes. This has resulted in quality ICT program implementation and students' professional development.

Also, according to OECDDAC (2002) in UNESCO (2016) evaluation refer to a systematic and objective process of assessing a project that is in progress or has been completed, a program, its policy, its design, its implementation and results in order to determine objectively the relevance, attainment of goals and objectives, development effectiveness and efficiency, impact and sustainability. Therfore, evaluation plays a catalyst role in ensuring that ICT program planning processes are specific, measurable, attainable, realistic, and time bound. With these quality taken into consideration in the planning processes, then students' professional development is assured.

The correlation between planning process and students' professional development resulted in a coefficient of 0.15and a significance level of 0.01 (2-tailed). This is in conformity with Olubisi, (2012) who conducted research on strategic planning and its effects on corporate performance using the survey research method and Pearson correlation as statistical tool. The results obtained showed that the effect of strategic planning on the management efficiency and effectiveness as strategic planning is important in corporate organizations, hence education. The study therefore, concluded that strategic planning is beneficial to organizations in achieving set goals and recommends that schools and other corporate organizations alike, should engage in strategic planning in order to enhance corporate performance. Corporate performance is a product of students' professional development. Therefore, ICT program planning process significantly influences students' professional development in teacher training colleges in Cameroon.

These accessions give a perfect response to research question two (2); Does ICT program planning process affect students' professional development in teacher training colleges?

7.2.3. ICT program planning context significantly affects students' competence development in TTCs

The findings confirm that ICT program planning context significantly influences students' professional development in teacher training colleges. Pearson correlation ICT program planning context and students' professional development had a coefficient of 0.40, and the significance was at 0.00, resulting in a significance level of 0.01 (2-tailed). The coefficient of determination (r^2) was at 0.16; therefore 16% of the variance in students' professional development in teacher training colleges is explained by ICT program planning context and vice versa.

This in accordance with the findings obtained from the interviewees in the interview process where, findings of interview exchanges or discussions ICT program planning in TTCs with respect to financial issues, with diverse views the interviewees at a 100% absolute majority rate acknowledged that ICT program planning in TTCs is influence by financial issues which in return affect students' professional development. Responding to the questions on the role of socio-political issues on ICT program planning in TTCs, the participants at an 80% rate agreed that socio-political issues of the country has influence on ICT program planning. Also, at 80% rate, the respondents to the interview guide acknowledged that health issues play a great role in planning of ICT program for TTCs making it relevant to professional development. The all interviewees though with divergent views agreed that resources ranging from human, financial and material are some of the factors that influence ICT program planning for TTCs that subsequently affect professional development in student teachers.

These results are in conformity with Mukhopadhly (2015) who affirm that anaysis of decision making in the planning context should be done taking into consideration all relevant factors. Also, Puamau (2006) hold that educational (program planning) planning must take into consideration the local realities of needs, values, and culture. This is because needs, values and cultures differ so also as their philosophy on education. This view is concord by Aggarwal and Thakur (2003) who reaffirm that diverse philosophers and educationist have examined education from different angles. Therefore, the purpose of educational statistics globally according to UNESCO in Aggarwal and Thakur (2003), is to understand its evolution, organise, and put in place a communication design that facilitate learning within a particular geographical and cultural zone or area taking into consideration local realities.

This result is in accordance with the World Bank Group (2019) declaration that Cameroon needs to invest hugely in digital technology as well as ICT in order to benefit a fraction of the digital economy wealth. This wealth can highly change the financial status of the country and elevate poverty while providing sufficient financial resources for efficient and effective ICT program planning resulting in professional development. This assertion is supported by Ndeh-Mboumien, N. E. (2018) who states that in the AICD (World Bank Africa Infrastructure Country Diagnostic Country Report 2011) Cameroon experienced growth performance after being exposed to ICTs.

The results on ICT program planning context and its effects on students' professional development is in accordance with Hudry and Monjardet (2010) who affirm that generally consensus theory represents any phenomenon where several 'objects' are merged into one.

These ‘objects’ should be of similar or the same nature and the best representative object. In multiple criteria decision aid and social choice theory objects preferences are expressed through a set up criteria or through voting. These preferences are more often modelled through a fuzzy-binary or by-crisp relations of various kinds, which has a possibility of being represented by utility functions. In a situation where preferences are expressed through choice functions, cluster analysis is used to ensure that the objects under aggregation are classified, partition in terms of equivalence relations or hierarchies. Hudry and Monjardet (2010) further take the example of computer science where ranking can be done through web search engines; and merging objects that are symbolic is considered as an artificial intelligence topic.

Also, these results are in conformity with Cameroon’s Ministry of Public Health (2019) declaration that e-health was unanimously endorsed based on the World Health Assembly Resolution on e-health by the World Health Organization (WHO) in 2018. This resolution recognizes and acknowledges the value and role of digital technologies (ICTs) in the advancement of universal health coverage and attaining Sustainable Development Goals (SDGs) health objectives. That is why the ministry of basic and secondary education has taken into consideration when doing the ICT program planning especially for teacher training colleges those ICT knowledge, skills, abilities and competences that will in the future facilitate e-health for those who will pick up careers in health.

Furthermore, the Pearson correlation of ICT program planning context and students’ professional development had a result coefficient of 0.40, significance of 0.00, resulting in a significance level of 0.01 (2-tailed) is in conformity with Suleman (2018) carried a study on the ICT and educational planning for sustainable development in the educational sector in Sokoto state, Nigeria. The aim of the study was to find out whether ICT tools are available for educational planning and whether there exists a relationship between ICT and educational planning in Sokoto state. Findings revealed that there is a significant influence of ICT and its application on effective educational planning in Sokoto state. Therefore, ICT program planning context can be affirmed to have a significant influence on students’ professional development in teacher training colleges.

Also, Russell (n.d) Carried a study that aimed at determining the nature and extent of Government school teachers ‘anxiety in Queensland, Australia, consulted with undergraduate students doing two years course in computer education. The results of this study were presented under four headings: computer access and usage with 91% agreeing with the proposition that ‘the computer is a necessary tool nowadays’, as concerns computer competence and anxiety

only 22% of the sample agreed with the statement that they 'have no difficulty understanding the technical aspects of computers'. Then Some 71% of the sample had completed no computer-related subjects when they attended school, 66% had taken no specialist computing subjects at university, and 57% had undertaken no additional training with computers outside university.

Furthemoremore, the result of ICT program context and students' professional development is in accordance with Koehler and Mishra (2008) in Harris and Hofer (2011) who consder TPACK to be characterised by teachers' knowledge of the content in the curriculum, general pedagogies, tecnnologies, as well as contextual infuences on the learning process, making TPACK multi-intersectional. Also, Voogt et al. (2016) states that the manner in which technology is understood determine the measuring approach to be undertaken to verify a teacher's technology pedagogic content knowledege.Voogt et al. (2016) TPACK is considered by most scholars as a complex concept, however it resonates with practitioners in the field of educational technology of which Information and Communication Technology(ICT) program is a key component. The planning of ICT programs for teacher training colleges take in to considration prevailing conntextual factors, to enhance, professional development.

Also, Piabuo, Piendiah, Njamnshi, & Tieguhong (2017) are in conformity with this result when they state that to meet the demand of today's planning needs, strategic objectives and focusing on value adding activities does not only lead to change from effective planning but meet the expectations of professionals. The case of ICT program planning for teacher training colleges in Cameroon is no different. This is why Piabuo et al. (2017) hold that, human resources in planning play the role of designing knowledge, skills, attitudes, and behaviours expected from the program by the state and the society as a whole.

Also, the model has to do with the way technology is understood during planing and teacher/knowledge interaction. Harris and Hofer (2011) attest that TPACK has to do with a highly applied specialised type of knowledge that supports technology that is content based and faciliate integration. For technology to be integrative the ICT program planning process takes in to account contextual factors such as financial issues, socio-political issues, health issues and resources which directly or indirectly influence students' professional development as shown by the interview results at an average rate of 90%.

The findings and these accessions give a perfect response to research question three (3); to what extent does ICT program planning context affects students' professional development in teacher training colleges?

7.2.4. ICT program planning constraints significantly influence students' competence development in TTCs

Results from the findings show that ICT program planning constraints significantly influences students' professional development in teacher training colleges. The Pearson correlation for ICT program planning constraints and students' professional development in teacher training colleges had a coefficient of 0.51, significance stood at 0.00, resulting to a significance level of 0.01 (2-tailed). The coefficient of determination (r^2) was 26.00. Therefore, 26% of the variance in students' professional development in teacher training colleges is explained by ICT program planning constraints and vice versa.

This result is in conformity with the findings obtained from the interview sessions, where findings gotten from the interviewees during the respective exchange sessions on ICT program planning in TTCs with respect to context, showed that though with divergent views the interviewees at a 80% absolute majority rate acknowledged that ICT program planning in TTCs is influence by the context which in return affect students professional development. Also, at 80% rate, the respondents to the interview guide acknowledged that health issues play a great role in planning of ICT program for TTCs making it relevant to professional development. The all interviewees though with divergent views agreed that organisational factors influence ICT program planning for TTCs, which in return affect students' professional development. Responding to the questions on the role of technological consideration in ICT program planning in TTCs, the participants at a 80% rate agreed that technological considerations greatly influences TTCs ICT program planning.

These results are in accordance with Ibrahim and Mofarreh, (2016) who worked on the implementation of ICT policy in Saudi secondary schools in secondary schools in Saudi Arabia countries. The objectives of the study were to understand the perceptions of the stakeholders about the implementation process of governmental ICT policy, it was also to identify factors that challenge and facilitate the implementation of the policy in secondary schools in Saudi Arabia. Findings in this study revealed that Saudi culture is equipped with new technology (new media) and as a result there is the need for the Government to incorporate ICT into the national education system. This study revealed several factors which hindered the

implementation of ICT policies in secondary schools in KSA including bureaucracy, scarcity of ICT policy planning and development processes, inadequate infrastructure and resources, poor training (skills, knowledge) and support (specialized personnel), time restraints, limited financial support, lack of leadership (coordination and management), the role of the individual (feedback), subjective norms, and change the process.

Also, this result is furthermore supported by the Ministry of Economy, Planning and Regional Development (2020) by stating that the financial system in Cameroon remains underdeveloped during the first phase of vision 2035 implementation with an average Gross Domestic Product (GDP) of 3.18%. These mean that there is low access to financial services and uneven distribution of financial resources. Furthermore, the Ministry of Economy, Planning and Regional Development (2020) revealed that there is low effectiveness in finances in general. However, the government has set an objective to through a number of reforms to make the country a first-rate financial centre with the capacity of financing a series of projects and programs. Therefore, ICT program planning cannot be effectively and efficiently carried out with financial obstacles.

The Results from the findings show that ICT program planning constraints significantly influences students' professional development in teacher training colleges. The Pearson correlation for ICT program planning constraints and students' professional development in teacher training colleges had a coefficient of 0.51, significance stood at 0.00, resulting to a significance level of 0.01 (2-tailed) is in conformity with Mekolle (2020) who affirm that the Cameroon educational system faces serious problems with regard to persistent wastage which compound the environmental, organisational, strategic, and resources crisis (Mekolle, 2020). This has resulted in difficulties in comfortable attaining planning goals and objectives in the educational sector. Therefore, constraints such as environment (urban and rural), organisational, strategic, and resource obstacles in the planning of ICT program in teacher training colleges in Cameroon are very visible from the findings on ICT planning constraints and its effect on student professional development.

The findings of this work are in accordance with UNESCO (1999) in Mekolle (2020) which reiterates that educational planning and implementation constrains revolves around infrastructural development, facilities, and human resource planning. Therefore, volatile economic periods demand the constant (annual) re-examination of resources, resulting in an adjustment of policy. Also, Mekolle (2020) emphasize that it is a global phenomenon that educational systems are constrained (obstructed) towards smooth functioning by insufficiency

of resources. Therefore, the results of this work show that developing countries and Cameroon in particular school age population increasingly constitutes the majority, resulting in a problematic situation especially in educational planning financing, and the demand for education is increasing beyond the capacity of the educational system in terms of resources and facilities. These in return greatly affect students' professional development in teacher training colleges.

Also, the findings on ICT program planning constraints and students' professional development in teacher training colleges is supported by world bank (2018) by stating that educational system as a whole in Cameroon is plague with weak governance and management issues which serve as critical constrains to the planning of ICT program in teacher training colleges. The World Bank considers the educational institution in Cameroon to be fragmented. Therefore, it is difficult plan programs especially ICT programs effectively given the national scale difficulties providing diagnostics, equipping decision-makers as well as educational planners with data on decision making policy planning guide as well as decision making and reforms in tracking student learning (The world bank, 2018) the current situation is technically very limited especially at the planning policy stage.

Also, the results on ICT program planning constraints and its effect on students' professional development is given more impetus by Tondeur et al (2016) who carried out a study on challenges in teacher professional development for the integration of ICT in Education in Kenya. titled "Responding to challenges in teacher professional development for ICT integration in Education". The research literature reports many different contexts of successful and unsuccessful teacher professional development program (TPD) that took place all over the globe. Findings showed that constraints range from engaging all stakeholders in developing a shared vision for ICT in education, engaging more teachers in communities and networks for professional development, reducing the gap between educational research and practice. The knowledge gained to develop an ICT-policy planning influences students' professional development.

Furthermore, the result is in accordance with the view of Pouezevara, Mekhael, and Darcy (2014) who holds that technology has a role to play in sustainability as well as it is sustainable in the planning process of ICT programs. This stage is concerned with identifying and selecting the technological tools that will serve over a given period of time as a result of its demand, appropriateness to the educational context of the country, easy to use, maintainable, and easy to repair. For this reason, Hepp et al. (2004) and Strigel et al. (2004) in Pouezevara,

Mekhael, and Darcy (2014) hold that technological tools and material acquisition turns to be catastrophic when the assumption of one tool or material has the possibility to be used all over the system or the territory. This is one of the issues of planning of ICT program for Cameroon's teacher training colleges are facing as obstacles to effective students' professional development.

Also, Krug and Arntzen (2010) further states that this Kenyan case illustrates how planning of school programs schools are influenced by multiple historic, social, cultural, economic, and political contexts such as challenges faced by school leadership in planning and producing the new curriculum policy on ICT integration in the Kenyan Ministry of education. This challenge is further aggravated by specific social, physical and cultural conditions of each school's context such as lack of electricity or power breakdowns, insufficient time, and the number of learners. It was concluded that effective planning or preparation of pre-service teachers for technology integration requires attention of all the stakeholders at different levels in the education system, local factors (cultural and structural), but also demands similar attention toward the relationships between the themes (Kay, 2006; Tondeur et al., 2012). Therefore, the challenges in ICT program planning in the educational sector have a significant influence on students' professional development.

The fourth research question has been positively answered and justified by findings and literature of researchers and others; Does ICT program planning constraints affects students in professional development teacher training colleges?

These finding with respect to ICT program planning and its effects on students' professional development are supported by Aggarwal and Thakur (2003) who consider planning as a formal process with the purpose of making decisions on the future of both individuals and organisations. They also hold that, planning has to do with aims, goals and objectives, selecting scientifically correct strategies and activities or programs to attain set aims, goals, and objectives through determining and allocation of available resources as required and above all communicating plans and every activity to all those concerned. That is why Adams (2002) reinforces this point of view by stating that the general trends in planning profoundly affects educational actors and decisions. This influence ranges from change strategies, localisation of curricula opportunities, giving concepts such as quality operational meaning, establishing the relevance and efficiency of education and the nature of educational financing.

Aggarwal and Thakur (2003) therefore, conclude by stating that plans refer to a statement of activities to be carried out, the sequence to be followed in execution, and the timing or the period and duration required for the activity to be done with the vision of attaining a set objective. ICT program for teacher raining colleges cannot be planned without goals and objectives; and one of its main goals is to enhance the professional development of student teachers through the exploitation of ICT tools and resources.

Also, the findings of the study are in accordance with the United Nations (2005) in its declaration of the world at the World Summit on the Information Society. It seriously takes note of the potential of ICT to expand access to quality education, to boost literacy, and to provide universal primary education in developing countries. Also, findings show that national policies and programs can be an important tool for the realization of ICTs promises in education. In the same light, WBI (2007:125) reports that many developing countries, however, continue to struggle with difficulties stemming from unresolved problems such as expanding education coverage in a sustainable way, inequalities of access and outcomes, educational quality and relevance, and inflexible governance structures and management practices (Kibinkiri, 2014).

7.3.0. LIMITATIONS OF THE STUDY

The researcher was faced with some challenges in the course of carrying out this study in the field. They are worth stating:

- The major challenge was that few people have written on different aspects of planning ICT programs in Cameroon. This hindered acquisition of documentary research. However, the researcher exploited online books written on ICT in education in other parts of the world as it concerns planning.
- Furthermore, there was a lot of bottlenecking in our struggle to gain access into information in colleges, delegations and the ministry. Several times when we apply for access to information, it would take several months and at times we were told statistics are not available, this greatly slowed down the field work process. But thanks to the perseverance and determination of the researcher.
- In addition, many respondents for questionnaire and interview had a look warm attitude. They complain of lack of time. Some collected questionnaires but could not fill or return it. This went a long way to slow the process. Some openly asked for motivation before they could cooperate. This made the field work initially planned for four months to take close to a year. To solve these problems, the researcher raised more money to motivate

respondents. Interview took a longer time because of the hectic nature of potential informants' daily schedules

- Getting participants and respondents to understand the concepts: The natures of the study from outlook seem very easy to understand. Ironically when the researcher got to the field he had to work with some of the respondents and the participants for over five months to them to understand the purpose of the research work and its variables. Since these respondents and participants were in five different regions of the country, it was difficult to educate them because many of them had little mastery in the use of social media. The first meeting was held with participants which concern the training about the nature of the study. All these made the work of researcher extremely demanding in terms of time and finance.
- Inadequate finances: This study was financially very demanding. The participants and those to be interviewed were found in different regions in the country, and there was need to assist them financially so they could use for internet connection. On the part of the questionnaire some respondents were not materially or equipment equipped to respond to questionnaires online. Therefore, the questioner had to be printed out and people trained to administer the questionnaire to this particular group of respondence. Compensating the respondents after responding was also financially very demanding, given that there were 417 respondents. Also, the work was single handily financed by the researcher. Furthermore, given that the researcher recruited and trained personnel to assist in the research process, was financially demanding in terms of materials, transportation and motivation.
- Scepticism of some of the sample population: Also, some of the respondents especially in the Bamenda and Buea were sceptical about research because to them it could be for spying purposes, and some were not willing to fill in their preliminary information on the questionnaire as they expressed security concerns. These group of participants had to be convinced and some never understood. This temporally reduced the accessible and target population from what was originally planned by the researcher, which resulted in demand for more time than was planned.
- Another limitation I faced in the course of this work was the loss of my husband. It gave be unbearable pain and slowed the process but thanks be to God I overcame it by using the word of God. I was encouraged to work because he supported my doing the program.

7.4.0. PEDAGOGIC INNOVATION AND IMPLICATIONS

This work entitled "*Educational policy planning of ICT program and its effects on students' professional development in selected Teacher Training Colleges in Cameroon*", has given the research the opportunity to bring in pertinent innovation with concrete pedagogic implications on the Education system in Cameroon, Educational Policy planning in ICT, Primary Teacher Training, the higher education sector and the policy implementation and professional Development The research work has enabled the researcher to propose a model for planning and implementing ICT program in Teacher Training College. This innovation will facilitate the job of educational planners and will orientate educators, lecturers, Teacher trainers and in general on principles to consider when planning and implementing an ICT program.

7.4.1. PEDAGOGIC INNOVATION

This work introduces the "*model for planning and implementing ICT program in Teacher Training College aimed at professional development of student teachers"*, which establish the principles and their indicators to be considered when planning and implementing an ICT Program geared toward professional development of students in Teacher Training Colleges. Teachers in general and the primary school teachers need to be well trained on applying ICT in the teaching learning process.

7.4.1.1. A Proposed "*model for planning and implementing ICT program in Teacher Training College aimed at* competence *development of student teachers"*

COMPONENTS OF ICT PROGRAM PLANNING OF THE MODEL

Planning of ICT program and determining its effect on students' competence development has a number of components to be examined. These components are; planning norms, planning process, planning context, and technical and planning constraints.

Planning Norms: For planning norms to be determined, its national instruments, goals, assessments, and external instruments have to be established and examined as within standard norms. Planning norms are essential important components in students' professional development because they determine the professional elements to be planned such as knowledge, abilities and skills, aptitudes and attitudes planned by the planners and how effective and efficient they will become professional students. Therefore, it is necessary to find out the planning norms as a component for improvement purposes, innovation, and invention.

This model is supported by Yangsi (2014) who holds that planning norms in Cameroon are classified into legislative and regulatory texts which define rules of general conduct. These texts include; the constitution, international instruments, laws, ordinances, decrees, orders, decisions, instructions, or directives. These texts are therefore further classified into internal or national and external or international instruments. The respect of planning norms in education has offered greater opportunities for improving the educational sector. Therefore, the revision of the teacher training program and ICT in particular in 2013 by the ministry of secondary education was meant to adapt the program to current policies and norms in education.

Planning Process: Also, in establishing the planning process of ICT program for teacher training colleges has to do with a pedagogic planning process. This process has to do with doing diagnoses, planning implementation, monitoring, and evaluation. Planning has to be professional by understanding the problem to be solved through diagnosis, planning has to make provision for implementation (strategies), it has to understand the prevailing contextual issues, and guard against planning constraints for educational planning polices or aims, goals, and objectives to be attained for effective and efficient professional development.

According to WikiEducator (2021) planning process especially on ICT program refers to the procedure of constructing a generic and logical structure. In a country for planning process to be effective and efficient, there has to be an identification and analysis of the national goals, construct a draft educational plan and choose the best alternative, approve and experiment, after the experimentation face modify, implement and monitor, then evaluate and give feedback. Furthermore, Ahmad, Ahmed, and Al-Lawati (2010) attest that long-term learning that are effective and efficient and depend on the planning of the interconnections within topics and application. Therefore, planning as well as teaching processes are factors for the attainment of efficient long-term learning in all disciplines especially in ICT

Planning Context: Context of ICT program planning involves the contemporary state of affairs in the environment or country. The contemporary issues in Cameroon today that affect planning of ICT programs for teacher training colleges can be examined under financial issues, socio-political issues, health issues, and available resources.

In the affirmations of Wagner, et al. (2005) contextual issues in education planning have brought about a number of international agencies, national organisations, specialists, professionals, and program planners and developers to promote the implementation of ICT in

education with the vision of ICT as a catalyst for social and economic change and subsequent development.

Therefore, the World Bank Group (2019) affirms that Cameroon needs to invest hugely in digital technology as well as ICT in order to benefit a fraction of the digital economy wealth. This wealth can highly change the financial status of the country and alleviate poverty while providing sufficient financial resources for efficient and effective ICT program planning resulting in professional development. Furthermore, Ndeh-Mboumien (2018) as cited in Dutta et al. (2016) stated that Networked Readiness Index (NRI)in assessing that network state of readiness of a number of selected economies in line with the Global Information Technology Report indicated that Cameroon was amongst the countries at the bottom of network readiness state with a reputation of one of the worst. However, it also indicated some marked improvement which has to be improved through the assessment and subsequent improvement of resources.

Planning Constraints: Planning ICT program in teacher training colleges cannot be properly done without examining and establishing problematic issues which pose or might pose as an obstacle in the planning process. The planning process in general and that of ICT programs for teacher training face some difficulties which range from the context, organisations, strategies and technological disposition. Therefore, the context, organisations, strategies and technological dispositions related to planning of ICT program has to be cross examined to determine its impact on the planning process which subsequently affect students' professional development in the course of training.

In the current dispensation, teacher education planning in general and ICT program in particular today has a great role to play in students' professional development which cannot be isolated. Therefore, students' professional development refers to the extent an individual and group of individuals' collective professional knowledge, ability and skills, aptitudes and competency needs of the learners with respect to their future chosen profession is met. If the planning process does not manage its constraints effectively the result will be ineffective professional development on the part of the learners as a result of an unrealistic program.

According to Mekolle (2020) in almost all countries the educational systems face the difficulties of insufficiency of resources which pose as a barrier or obstacle for smooth functioning. Also, the world bank (2018) affirms that the educational system as a whole in Cameroon is plague with weak governance and management issues which serve as critical

constraints to the planning of ICT program in teacher training colleges. Also, The world bank (2018) examined lapses in the level of educational implementation level, the implemtation show lapses in the planning of implemetation phase. Furthermore, Pouezevara et al. (2014) affirm that technology has a role to play in sustainability as well as it is sustainable in the planning process of ICT programs, but if not well exploited it becomes an obstacle.

The proposed model on planning ICT program and students' professional development can better be understood from the figure …below.

A MODEL OF ICT PROGRAM PLANNING AND STUDENTS' COMPETENCE DEVELOPMENT IN TEACHER TRAINING COLLEGES

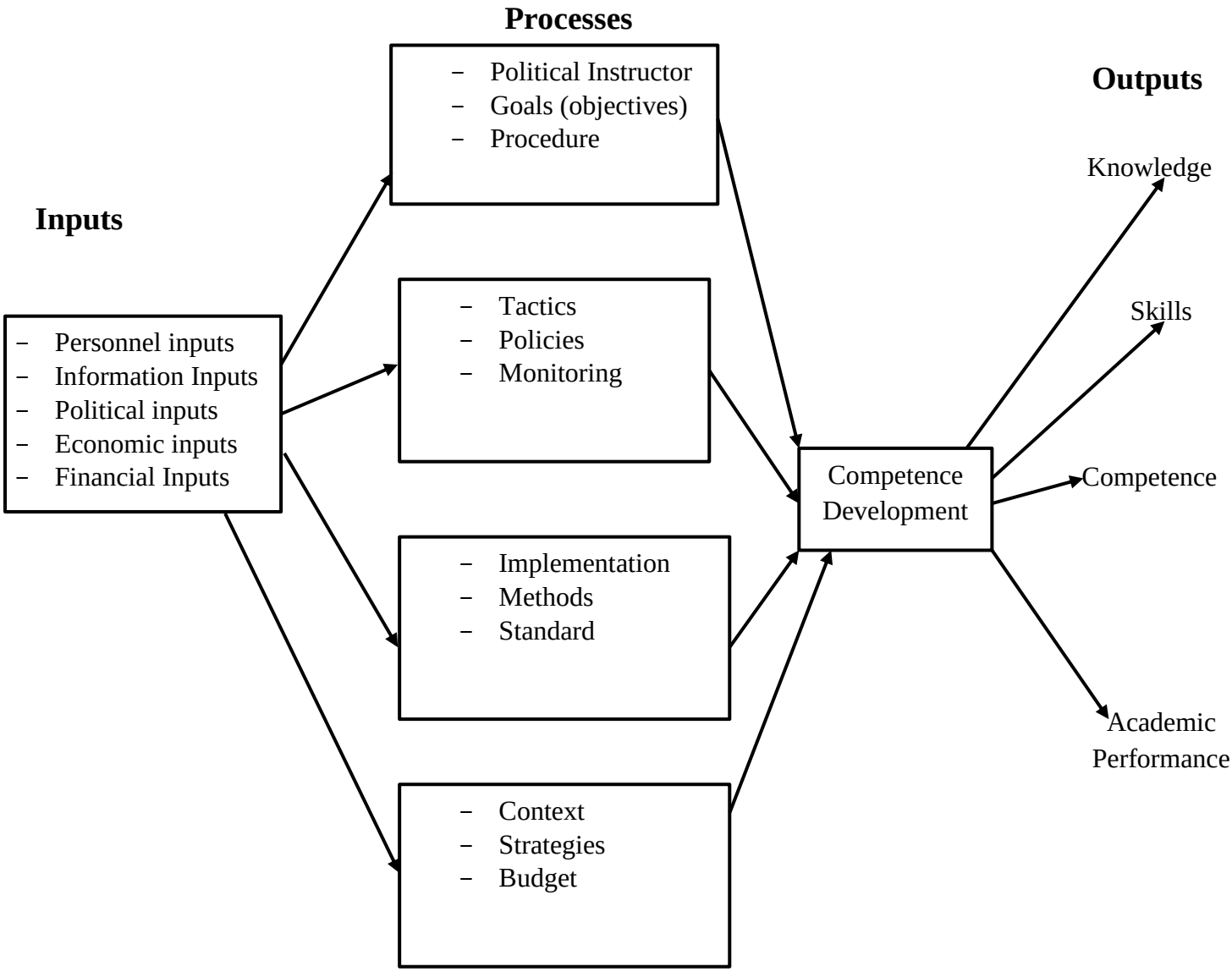


Figure 21: A Model of ICT program planning and students' competence development in Teacher Training Colleges.

Source: Amombi (2021)

7.4.1.2. STUDENTS' competence DEVELOPMENT

Students' professional development in this model focuses on teacher training from the perspective of knowledge, ability, skills, and competence development according to Kibinkiri (2014) professional development are the investments or improvements in human capital (acquisition of knowledge, skills, and competences needed for work and life). The fundamental reason for training teachers is to ensure their professional development for the enhancement of the teaching-learning process. Professional development in teacher education also refer systematically acquired experiences which, over a sustained period of time, enable teachers to acquire and apply knowledge, understanding, skills and abilities to achieve personal, professional and organizational goals and to facilitate the learning for students.

Furthermore, Rhodes and Houghton-Hill (2000) contend that professional development of teachers is seen as an essential ingredient for creating effective schools and raising students' performance. While Somers & Sikorova (2002) on their part add that the focus of professional development of teachers is the continuous updating of professional knowledge, skills and attitudes required of staff so that all students can learn and perform at higher levels.

Also, according to World Bank (2006) professional development in teacher training institutions creates and enhances human capital, contributes to the production of social capital (cohesion or social ties), increase economic growth which is an important determinant of economic development and good standards of living. For a teacher to be professional, to the extent of effectively integrating ICT in teaching, he/she must possess some basic competences.

Students' Construction of Knowledge

Knowledge is constructed through the exploitation of planned learning content. For knownledge to be qualitatively constructed, the new curricular for teacher training colleges in Cameroon targeted the five domains of the content taken from the former syllabuses, which consist of; Bilingual training; Didactics of primary subjects and nursery school activities; Science of education; Educational technologies and Reinforced alternated teaching practice (practicum) (MINESEC, 2013).

Development of Students Technological skills

Planning and development of TTCs ICT program takes into consideration not only ICT skills in general but digital skills in particular. It is for this reason that the World Bank Group (2019) hold that Cameroon has relatively been displaying a feeble though fair performance in

developing digital skills and infrastructure as it was ranked the 149th of 176 out of the countries world in World and the 17th in Africa in 2017 for the IDI (ICT Development Index) by the ITU (International Telecommunication Union). The skills acquired in schools have way for Cameroon to become one of the countries with early-stage IT entrepreneurial activities even in education.

Furthermore, according to the World Bank Group (2019) digital skills development is important today in developing a tech-savvy or techno pedagogic work force; this is to enhance advanced and basic digital tools to support or meet up with the increasing technological advances. This is very important in the educational system today for students' professional development because the world is going digital.

Improvement in students' Ability

Darling-Hammond, Hyler, and Gardner (2017) affirm that the right instructional methods in teacher training institution are accompanied by strategies such as workshops that put acquired knowledge and skills into practice, thereby enhancing students' professional abilities because it is based on human capital approaches which are evidenced based and leads to students' achievement.

Furthermore, according to Billa (2019) in education these days there is a lot of emphasis on the use of technology in planning, designing, developing and implementing educational program content for students' abilities development purposes. Also, Perlman et al. (2005) in Billa (2019) hold that this can be explain by the current trend of digital teaching and learning environment which facilitate active participation by making the teaching and learning process interesting, motivating, enable experience sharing, and create opportunities for repeated practice to enable ability development.

According to Darling-Hammond, Hyler, and Gardner (2017) effective professional development has to do with well structure professional learning that produces as results changes in teacher practices as a secondary effect improve students' outcomes or productivity. It is important in the 21st century for teacher training to include sophisticated teaching types that will help the future teachers in developing learners' competences and deep mastery through challenging content, enhancing critical thinking, solving complex problem situations, reinforcing effective communication and skills, and above all create a sense of self-direction (Darling-Hammond, Hyler, and Gardner, 2017). Effective professional development through

competency consolidation in TCCs in Cameroon is very possible through teacher training and refining of pedagogic skills.

It is for this reason that the Ministry of Secondary Education of 2013 corrected and adapted in 2014 the ICT program as a terminal competence to enable the student-teacher to be able to solve problem situations, exploiting resources from Information and Communication Technologies as to develop competences to teach Educational Technologies in primary and nursery schools (MINESEC (2013 and 2014). Therefore, competency consolidation in ICT program is realised through educational technology. Therefore, the program vice a vice its planning has to be evaluated from time to time for improvement purposes.

However, the focus of this study is to examine the effects of ICT program planning on students' professional development. Program planning variables of norms, process, context, and constraints do influence professional development variables of knowledge, skills, abilities, and competence. Therefore, planning and evaluation of how these variables interact to bring about effective professional development in specialised schools or institutions is necessary for educational quality improvement purposes with the use of ICTs.

7.5.0. PEDAGOGIC IMPLICATIONS OF THIS RESEARCH WORK

One of the main purposes of educational research works are suggesting ameliorative measures that will end up in improving the teaching and learning processes which the heart of change or impact in the educational sector. Therefore, educational research works have as bases of their desire and mission to ameliorate educational practices which will result in quality educational product and impact. Active educational process starts with policy and planning. Therefore, this research work has exposed how respective planning components affect or influence professional development with focus of the planning of ICT program for teacher training colleges in this technological age.

7.5.1. Students

This study has brought awareness and consciousness of students on the importance of ICT program planning components and the role they play in ensuring that professional development is more productive. The benefits that students stand to gain if they adapt an ICT driven teacher program are examined. The work has also facilitated understanding of planning some components involve in ICT program planning for teacher training colleges while it improves the quality of education through quality performance. The study enables students to understand the components involve in planning ICT program which will facilitate their

professional development which will enable them become professional ICT program planners and teachers in the future.

This work exposes the role of planning norms in planning ICT program from the perspective of national instruments (law, decrees, decisions, orders, service notes, strategic papers), goals, assessment methods, and international instruments (treaties, conventions and Charters); planning process from diagnosis, implementation, monitoring, to evaluation; planning context from the perspectives of financial, socio-political, health, and resources issues; and constrains from contextual reality, organisation, strategies and technology. All these components influence students' professional development from the perspective of knowledge, skills, abilities and competencies. Therefore, set the foundation for student teachers as future program planners in the basic education ministry.

7.5.2. Teachers and tutors

This study highlights the benefits that teachers stand to gain if they adapt an ICT driven teacher program. This work presents to teacher trainers, and tutors that ICT program planning is a force to reckon with in the educational system. While there is much focus on the efficient teaching of ICT and technology in general in schools and classrooms, some teachers do not understand how the program is planned and the considerations put in place for its realisation for effective and efficient teaching. Planning is one of the key stages of a program and has to be understood in order to for implementation to be realistic in classrooms. Key components have been emphasised are those frequently used. The study has presented that teacher trainers, and tutors are also part of the program planning process which they should understand in order to effectively and efficiently implement the planning in classrooms taking into consideration the planning norms, the planning processes, prevailing contextual issues, and the constraining factors in order to ensure students' professional development in teacher training colleges.

Teachers are implementers of education policy. Teacher trainers and tutors of respective higher teacher training colleges have understood that they need to invest as in ICT program planning as individuals and as term. The world today is ICT oriented with enormous benefits. Technology in general and ICT has brought enormous benefits and professionalism in educational planning and the educational system in general. Therefore, teachers need to get very involved in planning especially and the school and classroom levels. The study has enlightened teachers and tutors to effectively plan and use Information and Communication Technologies in teaching and learning. They have also understood components involved in

planning ICTs such as planning norms, context, process and constraints. This work has also help teachers to understand the various exigencies involved in planning educational programs and its effect on professional development of students.

The work has also presented to teachers basic components that could be exploited in planning ICT program even at the classroom level such as planning norms (national instruments, goals, assessment methods, and international instruments), planning process (diagnosis, implementation, monitoring and evaluation), planning contextual realities (financial, socio-political issues, health, and resources issues) and planning constraints (context, organisation, strategies, and technology). The knowledge on planning of ICT program should be able to assess ICT program in teacher training colleges so as to improve the current educational phenomenon for efficiently in improving their students' professional development. This work facilitates teacher's comprehension on the difference between program planning and pedagogic planning and the role program planning plays in professional development.

7.5.3. Educational planners and administrators

This research study has exposed to educational planners and school administration the importance of program planning from some of the planning norms to be respected, key elements of the planning process, to some key contextual factors to put into considerations, understanding potential constraints that have to be managed or if possible eliminated. The proposed model on ICT program planning and students' professional development facilitate educational planners on strategies on verification planning components in ICT program planning and exploiting the information to improve program planning that results in effective and efficient students' professional development by constructing sustainable skills knowledge, skills, abilities, and competences.

In applying ICT to education, educational planners set the framework and make major decisions covering all the aspects of program planning, implementation and evaluation. At the Government and managerial level, it has helped the government in educational planning and budgetary allocation that will handle the provision and effective use of ICTs in schools. It has provided empirical evidence to curriculum policy makers and planners on the role and effectiveness of ICT programs in professional development of student teachers. Policy makers have presented identified gaps that exist between policy, planning and practice, and recommendations have been made to bridge them. The study has also encouraged teacher

training college administrators to effectively plan and implement any existing ICT reforms for effective professional development of student teachers.

7.5.4. Parents/sponsors and community

This study will enlighten parents on the role played by ICT program on students' professional development. They have been presented how ICT program is planned and the respective key components, some of the factors that accompany these components and the role they play in bringing about sustainable professional development which will determine the educational future of the youths and the country as a whole. Therefore, parents, sponsors, and community learners need to get involve and assist in making educational planning process more realistic, reliable, more professionally and development oriented. The work exposes parents, sponsors, and community to how what role they can play in the educational program planning process in supporting the planning institutions so have to have a quality, professional oriented, and community development-based program at the end of the planning activities. This will result in teachers who will be well equipped to take the community and country to the next level of Information and Communication technologies in this technological era.

7.5.5. Educational community

This work endeavour to enlighten internal and external educational partners from local associations such as the Parents Teachers Association, to national and international Non-governmental organisations, and governmental structures such as Education System Analysis Program, known in French as Program d'Analyses de System Educative (PASEC) of CONFEMEN (conference of educational ministers of la Francophonie) and UNESCO (United Nations Educational Scientific and Cultural organisation, UNICEF respectively to understand the financial, material and technical offered has to be multiplied to encourage more effective and efficient program planning activities in the teacher training colleges. The teacher education department in the Cameroonian Education system is in need of reinforced educational planning technology in the planning of ICT program for teacher training colleges to make it more practicable and realistic in students' professional development.

7.5.6. Policy makers, educational planners and the state

Policy makers are in charge of shaping the country's educational policies and ensure who shall be educated, what they shall be educated about, what shall be educated about, and how they shall be educated. This study presents the government and its ministries of education the opportunity of revisiting the importance of educational planning and ICT program planning in

teacher training colleges with a student' professional development vision or goal. This work has as primary and secondary objectives to motivate and orientate the government to continuously organise and finance educational planning sessions especially for ICT programs in the age of technological advancement. Planning should not only be left in the hands of specialist but the educational community needs to get actively present especially student teachers and teacher trainers. ICT programs have to be planned having in mind Article 4 of 1998 law of orientation which stipulates the aim of primary and secondary education as "*to train children for their intellectual, physical, civic and moral development and their smooth integration into the society bearing in mind prevailing economic, socio-cultural, political and moral factors*".

This research work facilitates the activities of the state through data in realising the Cameroon educational aim in this technological age through the planning of ICT programs for teacher training colleges in relation to students' professional development. The government and policy makers (politicians) have to introduce educational planning reforms that take effective consideration to existing planning norms, efficient planning processes, contextual realities, and eradication of prevailing constraints. This will bring about effective and efficient students' professional development which will not only be useful to the educational system but the communities and the nation as a whole as elaborated in the education and strategic growth document.

7.6.0. RESEARCH WORK AND THE MODEL ON ICT PROGRAM PLANNING AND STUDENTS' COMPETENCE DEVELOPMENT IN TEACHER TRAINING COLLEGES

The model on the planning of ICT program and students' professional development is a product of this research work. The world today is in the technological and digital age, therefore the educational system and educational planning cannot be left out. The importance of Information and Communication Technologies as a subject, resource and tool has to be treated with outmost importance and constantly evaluated for ameliorating and updating purposes especially in teacher training colleges that have to do with students' professional development. These student teachers are trained to be future teachers on whom the "android generation" will be entrusted for the social, cultural, economic, and political development of the country.

This research work and model on ICT program planning and students' professional development present to educational program planners, educators in general and educational

evaluators (educational planning evaluators) a straight approach, varied components and factors that has to be take into consideration when planning ICT programs for teacher training colleges and evaluating ICT program to establish its relationship with students' professional development variables.

Planning is an indispensable activity in the educational life of a nation. This research work and its proposed model have been able to present the role of ICT program planning components in education and teacher training in particular, and have shown how it affects the educational product of students' professional development. The technology level in most teacher training colleges in Cameroon are still at the take-off as more is still required to be done to put its at standard level for effective and efficient students' professional development. The future of the country and the educational system will be highly determined by Information and Communication technology as program, subject, resource or tool. Therefore, this research work in its effort to increase knowledge and create awareness has presented ICT program planning components, their indicators and manifest and how they can be exploited to the construction of knowledge, development of abilities and skills, and reinforcing competences that result in students' professional development, which is the mission of teacher training colleges in Cameroon.

This work has added to education through literature and theories sciences, and the proposition of the ICT program planning and students' professional development.

8.0. RECOMMENDATIONS

From the findings gotten from this research work, the researcher came up with the following recommendations, with the possibility of improving ICT program planning that will result in efficient students' professional development in teacher training colleges.

8.1.0 To students / student teachers

Students are recommended to make conscious efforts in improving their knowledge in ICTs for this go a long way to accelerate their professional development especially as they are faced with a very competitive job market.

8.2.0 Teachers / lecturers or tutors

It is recommended that teachers should be very involved in planning especially at the school and classroom levels, since they are the implementers of education policy. Teachers and tutors should effectively plan and use Information and Communication Technologies in

teaching and learning. They must take into cognisance components such as planning norms, context, process and constraints.

The researcher is launching an appeal for teacher trainers in Cameroon irrespective of gender, age, academic statues to make it a duty to adequately embrace the computer assisted teaching culture and also do well to upgrade their skills in ICTs, a situation that will permit them to carry out certain challenging activities in their respective colleges without tears.

8.3.0 To educational planners and school administrators

Educational planners should encourage the government of Cameroon to support ICTs based training and research by investing more than ever before in training grants and individual graduate studentship. ICT programs in teacher training colleges should be supported by the government by way of subvention.

Website can be created for teachers to frequently visit and upgrade some information like feeling of electronic report cards

The researcher is recommending that educational planners and school administration at the Government and managerial levels should include specific planning indicators in a bit to plan ICT program geared at promoting professional development. These indicators are planning norms, process, context and constraint bearing in mind that indicators of professional development of students are abilities, skills, and competences. The proposed model on ICT program planning and students' professional development facilitate educational planners on strategies on verification planning components in ICT program planning and exploiting the information to improve program planning that results in effective and efficient students' professional development. They should be stimulated to push for better reforms on the provision and planning of integration of ICTs in teaching. Planners should consider budgetary allocation when elaborating all the aspects above as these will foster effectiveness of the plan.

The researcher recommends that a good number of well spacious, staffed and well-equipped multimedia centres/ ICT laboratories be created in the teacher training colleges. There is growing need for avenues where a great number of students can commune to do research, discuss/ interact or disseminate information to whosoever. The mere creation of the said multimedia centres would not be a panacea if it is not accompanied by the recruitment of experts in the ICTs to man such projects and the equipment of the centres with up-to-date computers. In table 36 below of subject and duration it is observed that there is no period of

ICT practical so the researcher suggests that extra period of ICT practical should be put in place where students and teachers will use to practice.

Table 37: Time table of GTTC Fundong 2021/2022

Day	Level	7.30-8.30	8.30-9.30	9.30-10.30	10.30-11.30		11.30-12.15	12.15-1.15	1.15-2.30	2.15-2.30	2.30-3.30	3.30-4.30
MONDAY	1	PROF ETHICS **AWAH SAMUEL**	FRENCH **KAFAIN YUH J.**	MATHS DIDACTICS **NGAIN KELVIN**	EDUC PSYCHOLOGY **RITA NDAPKWI**			DIDS OF SONGS **TANDI VICTOR**	POLICY/COMP **SUH ISIDOR**		DIDS PRACT. AC. **VIMOH EFFETI**	PEDA SUPERV. **BAN CHARLOTTE**
	2	MATHS DIDACTICS **NGAIN KELVIN**	ENGLISH LANG. **VIMOH EFFETI**	DID OF FRENCH **OLEMBA ETIENNE**	FRENCH **KAFAIN YUH J.**			ACTION RES. **WIRNKAR**	DID. OF SONGS **TANDI VICTOR**		DID SPORTS **MBAKU**	DID PRACT. AC. **VIMOH EFFETI**
	3A	ENGLISH DID. **AYONG SOLOMON**	MATHS DIDACTICS **NGAIN KELVIN**	DIDS PRACT. AC. **VIMOH EFFETI**	DID ENV EDUC **NCHA FELIX**		**Break**	ACTION RES. **WIRNKAR**	EDUC PSCHOLOGY **RITA NDAPKWI**	**BREAK**	GEN PEDADODY **BIH EUNICE**	DID SPORTS **MBAKU**
TUESDAY	1	FRENCH **KAFAIN YUH J.**	DIDS PRACT. AC. **VIMOH EFFETI**	DID HIST/GEO **KUBUO B.**	ICT **NGUENKO ABEL**			PROF ETHICS **AWAH SAMUEL**	LEG/SCH ADM **MULUH RINKLINE**		DID NAT. LANG **EWANG PRIDE**	LIBRARY
	2	DIDS PRACT. AC. **VIMOH EFFETI**	DID EDUC TECH. **NGUENKO ABEL**	PROF ETHICS **AWAH SAMUEL**	DID NAT. LANG **EWANG PRIDE**			CITIZEN EDUC **MBUYE PAULA**	DID HIST/GEO **KUBUO B.**		PEDA SUPERV. **BAN CHARLOTTE**	ACTION RES. **WIRNKAR**
	3A	LEG/SCH ADM **MULUH RINKLINE**	EDUC. STATISTIC **SUYI LESLIE**	DID EDUC TECH. **NGUENKO ABEL**	CITIZEN EDUC **MBUYE PAULA**			POLICY/COMP **SUH ISIDOR**	PROF ETHICS **AWAH SAMUEL**		ICT **NGEUNKO ABEL**	DID ENV EDUC **NCHA FELIX**
		7.30-8.30	**8.30-9.30**	**9.30-10.30**	**10.30-11.30**		**11.30-12.15**					
WEDNESDAY	1	DID. OF FRENCH **OLEMBA ETIENNE**	DID OF FRENCH **OLEMBA ETIENNE**	**BREAK**	DID NURS ACTS **LEM PATIENCE**		CITIZEN EDUC **MBUYE PAULA**	**CLUBS/MANUAL LABOUR/GENERAL SPORTS**				
	2	EDUC. STATISTICS **SUYI LESLIE**	PHILO OF EDUC **AZABA FLAVIAN**		FRENCH DID. **OLEMBA**		FRENCH **KAFAIN YUH J.**	**VP, DM, MBAKU**				
	3A	SOCIO OF EDUC **AZABA FLAVIAN**	DID HIST./GEO **KUBUO B.**		SUP. PEDA **BAN CHARLOTTE**		DID SPORTS **MBAKU**					
THURSDAY	1	ENGLISH LANG. **VIMOH EFFETI**	ENGLISH LANG. **VIMOH EFFETI**	DID ENV EDUC **NCHA FELIX**	EDUC PSCHOLOGY **RITA NDAPKWI**			GEN PEDADODY **BIH EUNICE**	LEG/SCH ADM **MULUH RINKLINE**		DRAWING/WRIT. **TANDI VICTOR**	DID EDUC TECH. NGUENKO ABEL
	2	GEN PEDADODY **BIH EUNICE**	GEN PEDADODY **BIH EUNICE**	EDUC PSCHOLOGY **RITA NDAPKWI**	DID NURS ARTS **LEM PATIENCE**			ENGLISH LANG. **VIMOH EFFETI**	ICT **NGUENKO ABEL**		DID ENV EDUC **NCHA FELIX**	LEG/SCH ADM **MULUH RINKLINE**
	3A	EDUC PSCHOLOGY **RITA NDAPKWI**	EDUC PSCHOLOGY **RITA NDAPKWI**	FRENCH **KAFAIN YUH J.**	DIDS PRACT. AC. **VIMOH EFFETI**		**BREAK**	ACTION RES. **WIRNKAR**	POLICY/COMP **SUH ISIDOR**	**BREAK**	GEN PEDADODY BIH EUNICE	DID OF SONGS **TANDI VICTOR**
FRIDAY	1	GEN PEDADODY **BIH EUNICE**	GEN PEDADODY **BIH EUNICE**	ENGLISH DID **AYONG SOLOMON**	ENGLISH DID **AYONG SOLOMON**			EDUC PSYCHOLOGY **RITA NDAPKWI**	EDUC PSYCHOLOGY **RITA NDAPKWI**		DID SPORTS **MBAKU**	DID SPORTS **MBAKU**
	2	EDUC PSCHOLOGY **RITA NDAPKWI**	EDUC PSCHOLOGY **RITA NDAPKWI**	POLICY/COMP **SUH ISIDOR**	MATHS DIDACTICS **NGAIN KELVIN**			SOCIO OF EDUC **AZABA FLAVIAN**	DID SPORTS **MBAKU**		ENGLISH DID. **AYONG SOLOMON**	ENGLISH DID. **AYONG SOLOMON**
	3A	MATHS DIDACTICS **NGAIN KELVIN**	ENGLISH DID. **AYONG SOLOMON**	GEN PEDADODY **BIH EUNICE**	FRENCH DIDACTICS **OLEMBA ETIENNE**			DID NURS ACTS **LEM PATIENCE**	PHILO OF EDUC **AZABA FLAVIAN**		DID NAT. LANG **EWANG PRIDE**	ENGLISH LANG. **VIMOH EFFETI**

Source: GTTC Fundong 2021/2022

8.4.0 To the parents / Community

Parents, sponsors, and local communities are recommended to make it a point of duty to partner with teacher training department, services and institutions to render educational program planning more productive by financing the processes especially the evaluation of its components with respect to students' professional development. This will result in this institution planning and developing an ICT program and other programs that standards with international standards and norms, while respecting national standards and norms as stated in the international instruments and goals of education, which will help the country in achieving Vision 2025 and emerged by the year 2035.

8.5.0 To Educational Community

It is recommended that educational partners, local associations, national and international Non-governmental organisations and governmental organisations such as United Nations Educational Scientific and Cultural organisation (UNESCO), should increase the financial, material and technical help they more often offer to encourage ICT program planning and implementation in the Cameroon Education system and the Teacher Training System in particular, and reinforce Information and Communication Technology in the teaching and learning process so as to make the Cameroonian educational system in general more professionally productive and efficient.

In addition, the researcher strongly suggests that every school that expect grants from an international organization for ICT integration, should provide an opinion on what he/she wants. The said information can be gotten by way of organizing an opinion survey on the type of intervention that the potential users really want. This is because it has been realized that most international organizations usually supply materials without actually carrying out an investigation to know the type they want and for what purposes. This partly explains why most of these valuable tools are under-utilized. Such information includes:

- The type of ICT equipment's needed
- The number of ICT devices required
- The various activities that are going to be executed with the ICT gadgets
- The current situation of the ICT integration process

8.6.0 To policy makers and the state

The researcher strongly recommends that a Grand National forum on the integration and effective use of ICTs of education in Cameroon be organized and the result of which should culminate in the beginning of a clear ICT implementation policy that all institution of learning; be they elementary, secondary or higher will be able to adopt at the levels of content material, teaching learning process to come out with various ICT Program policy.

Cameroon, Comoros, Guinea, Lesotho, and Madagascar fall under sub Saharan countries with no policy on ICT in education (RIA, 2012). Even though annual national technology days have been observed in Cameroon with the latest one been that 2016, the issue of ICT in education has not really been observed during any of the sessions. This justifies why the holding of a Grand National forum on ICTs in education in general seems eminent in Cameroon today. Such a forum should involve stakeholder from the six different ministries involve in education in Cameroon. Experts from some African countries such as Nigeria, Ivory Coast, Senegal and Kenya where ICT usage are relatively high should be invited to come and share best practices with the Cameroon educational community also learners administrators, guidance, NGOs, the civil society can be involve in this national forum.

Moreover, Government and all its stake holders concerned with education through the various ministries of education has to engage in an efficient ICT program planning for purposes of improving students' professional development in teacher training colleges. It is very important to understand the importance of developing and planning ICT programs in Teacher training colleges and the role ICT plays in professional development, thereby impacting education quality. The state should be encouraged to organise ICT programs planning in teacher training colleges as well as the need for planning programs in classrooms. In this technological age ICT program planning should be evaluated in relation its effect on professional development, and reforms should be carried out to improve ICT program planning in TTCs.

The state should also encourage by way of providing subvention and permitting private institutions to train ICT teachers so as to make up for the shortage of ICT teachers sent to TTCs in Cameroon.

It is recommended that policy makers should introduce a form of non-fragmented and integrative planning wherein all sectors and areas of the society are considered when planning. One sector of the country affects another either negatively or positively. The entire socio-

political, economic, nature of society, local realities, and resources should be taken into consideration when establishing ICT program. This would enable the achievement of skills, knowledge and competences in student teachers and consequently in primary pupils.

Table 38: showing Activities of the year 2019/2020

DATE	DAY
Monday, 5 October 2020	The World Teachers' Day
Friday, 9 October 2020	The National Day for the Promotion of Didactic material produced from local and/or recycled Materials
Wednesday, 14 October 2020	Global Hand washing Day with water and soap
Friday, 16 October 2020	The National Guidance and Counselling Day
Thursday, 19 November 2020	The International Day of Philosophy
From Monday, 25 to Friday, 29 January 2021	The National Week of Bilingualism, classes shall be interrupted only on Friday, 29 February 2021
From Friday, 5 to Thursday, 11 February 2021	Youth Week
Sunday, 21 February 2021	The International Day of the Mother Tongue
Monday, 8 March 2021	The Commonwealth Day
From Thursday, 11 to Friday, 12 March 2021	''Open Days''
Friday, 12 March 2021	The National Day of Arts in school
Saturday, 20 March 2021	The ''Francophonie'' Day

It is proposed that, just like there are observation of days as seen in the table 38 above, the National Day of ICT should also be observed. This will permit a deeper touch of key principles in ICT.

8.7.0 Ministry of Secondary Education

Another recommendation, is that the ministry of secondary of education should in partnership with ministry of scientific research and innovation, national centre for education, and other ministries and organizations respond to the exigencies of the present generation in terms of technological advancements.

National days of ICT should be organized in schools where student and teachers should be able to showcase the advantages of ICTs thereby causing professional development of student teachers.

The Minister should ensure he/ she gets the exact number of ICT devices in all schools. Sometimes when accurate demographic data, statistics are not available planning becomes faulty. The state is also recommended to developed a well participate and comprehensive Educational policy to guide ICT implementation in Teacher Training Colleges. This comprehensive policy should take the form of active participation of teachers, students and educational planners and educational managers in private institutions etc. When participatory planning is practiced, everyone feels involved and thus develop the commitment for everyone to make changes. This kind of planning employs the bottom top approach instead of the other way round. Though planning is time consuming and involves many resources, it is worthwhile.

8.8.0 National and Pedagogic inspectors in charge of ICTs

The researcher recommends that national and pedagogic inspectors in charge of teacher training colleges should re-orientate their institutional policies and reforms in a way that ICTs will occupy a significant position and a considerable portion of the annual budget allocated for their realization in due time and space. These equipment's includes computers of all forms, printers, photocopiers, scanners, digital cameras, sound systems, broad band internet services, electricity backup systems.

Inspectors should do all they can to multiply the sources of this energy and proceed by making them to be present everywhere on campus while laying more emphasis on the installation of backup systems either in the form of automatic stand by generators or otherwise that are capable of running the machine several hours and even days where there is electricity cut or shortages in the colleges.

The administration should take it a point of duty the creation of ICT clubs for teacher training colleges and ICT associations for teacher trainers. There are ICT associations that take place in some secondary schools. Usually, teacher trainers are always invited to attend their seminars but do not benefit enough since the ICT course outlines for both institutions are not the same thing. It is therefore recommended that teacher trainers in teacher training colleges teaching ICT should come out with their own association where they will discuss activities that match with the primary school program. This Associations and clubs serve as mediums through which new concepts in ICT can be analyzed.

8.9.0 The State

It is recommended that adequate amount of fund should be put in place for effectively planning of ICTs in Teacher Training colleges. Funds are needed to train educational planners,

purchase equipments and tools and to search information for effective planning of the program. ICT program can be successful when there is no technical know-how. The Government should ensure the Minister of secondary Education, Inspectors, and principals should have a technocratic idea about ICT program since ICTs have become part and parcel of education.

In addition, the Government also should appropriately monitor, supervise and evaluate ICTs programs. This is because the success of any plan implementation depends on the effectiveness of supervision and evaluation system put in place. Frequent change of Government officers in charge of education at different levels should be avoided. The legislature has a direct influence on the planning process since it is responsible for policy formulation on educational development. Any Government officers come in with different styles of how to lead a program. Plans made by previous Government are discontinued when he or she leaves.

The state should provide adequate amount of ICTs tools, like computers, television, and radio for both the macro and micro levels planners. Lack of these materials handicap the teaching- learning process.

9.0 SUGGESTIONS FOR FURTHER RESEARCH

The research work or study focus on "*Educational policy planning of ICT program and its effects on students'* competence *development in selected Teacher Training Colleges in Cameroon*" with focus on planning norms, planning process, planning context and planning constraints. For further research, researchers can work in the following dimensions:

- The same work can be carried out using private teacher training colleges
- A comparative study can be carried out between public and private teacher training college on how they manage their ICT program.
- The same study can be carried out using experimental design instead of survey
- A study can be carried out on the characteristics of professional development of a primary school teacher.

10.0 CONCLUSION

Chapter five presented the interpretation of results, recommendation and conclusion. Summary of findings have been discussed following research questions and research hypotheses, interpretation of result is done in line with stated hypotheses and limitations of the study have also been presented. Also, the pedagogic innovations and its implications with a proposed model on planning ICT program and students' professional development and

pedagogic implication of the research work have been presented. Furthermore, the relationship between the research work and the proposed model have been established, recommendations have been made, and suggestions for further research are highlighted in the last segment of this part.

GENERAL CONCLUSION

The training of teachers has been an uphill task in Cameroon. This has been observed by many researchers and have concluded that aside from the many problems of education that the African continent today is facing, no one as imperative as the one relating to the efficient/ effective training of teachers (Fafunwa 1967, Afe1999). There should therefore be well designed programs aimed at improving especially primary school teachers. To be effective, policies need a consistent implementation strategy, including measures such as the allocation of adequate resources and setting up of coordination of mechanisms that ensure coherence monitoring and accountability. This is because planning cannot eliminate all unexpected events but without planning all events become unexpected. Such a strategy should take into account the multiplicity and stakeholders at both the national level (eg. Ministry of education, teacher training institutions, research bodies non-governmental organization) and the local level (e g. local government, head teachers and their staffs, parents and students), and involve them in putting educational policy into practice.

The hypotheses of the study were discussed and analysed through quantitative and qualitative findings (questionnaire and interview) and backed by authors findings and views. The main purpose of this study was to investigate the educational policy planning of ICT program and its relationship with students' professional development in teacher training colleges (TTCs) in Cameroon. The variables used were planning norms, planning process, planning context and planning constraints against students' skills, knowledge, competence and ability to bring out findings. A survey was carried out using questionnaires amongst teachers of fifteen (15) institutions in Cameroon.

The findings confirm that ICT program planning norms, planning process, planning context and planning constraints significantly influences students' professional development in teacher training colleges. Pearson correlation ICT program planning norms, planning process, planning context and planning constraints and students' professional development had high coefficient and good significance levels. Good percentage of the variance in students' professional development in teacher training colleges is explained by ICT program planning norms, process, context and constraints and vice versa. These results are in accordance with findings of interview exchanges for the four hypotheses.

A model was proposed titled "*Educational policy planning of ICT program and its effects on students'* competence *development in selected Teacher Training Colleges in Cameroon*" which has as one of its strong points the determination of components of planning:- planning norms, planning process, planning context and planning constraints and knowledge, skills, academic performance and competence as indicators for professional development of student teachers. Such innovation will orient educational planners, educators, lecturers, Teacher trainers and in general on determinants of planning and implementation of an ICT program. With this the researcher had the opportunity to bring in pertinent innovation with concrete pedagogic implications on the Education system in Cameroon, Educational Policy planning in ICT, Primary Teacher Training, the higher education sector and the policy implementation and professional Development.

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APPENDICES

APPENDIX 1

Questionnaire pour les enseignants de L'ENIEG

Je m'appelle Amombi Delphine Amana, étudiante au Doctorat à la Faculté des Sciences de l'Education de l'Université de Yaoundé I. Je mène une recherche intitulée **« la planification du programme sur les Technologies de l'Information et de la Communication et ses effets sur le développement professionnel des élèves : le cas des ENIEG du Cameroun ».**

Les TICs constituent un nouveau programme mis sur pied depuis 2013 au sein des ENIEGs et rentrent dans le cadre de la didactique des technologies de l'éducation. Le but de l'étude est de mettre en relation les différents niveaux de planification des TIC de votre zone. Nous vous assurons que votre identité restera confidentielle et vos données feront l'objet d'un usage strictement confidentiel.

Merci pour votre coopération.

INSTRUCTIONS: Remplissez les lignes ou cochez ("√") l'option de la case qui correspond à votre situation, option ou pratique scolaire.

PARTIE A INFORMATIONS PRELIMINAIRES

1. Informations démographiques

i. Région d'origine_____Departement_____Arrondissement_____

ii. Sexe : Homme ☐ Femme ☐

iii. État civil : célibataire ☐ marié(e) ☐ divorcé(e) ☐ veuf/veuve ☐

iv.Institution:_____Departement_____ Région _____

v. Nombre d'années dans la profession enseignante 1-9 ☐ 10-19 ☐ 20-29 ☐ 30+ ☐

vi. Diplôme Professionel: Diploma ☐ Master degree ☐ PENI ☐ PENIA ☐

Bachelor Degree ☐ Doctorate (PhD)° ☐ Others _____

vii. Age: 20-29 ☐ 30- 39 ☐ 40- 49 ☐ 50- 59 ☐ 60+ ☐

2. Autres Informations

viii. La matière que vous enseignez à l'ENIEG_____

ix. Les TIC ont-elles été intégrées dans vos cours/sujets académiques ?

- Oui
- Non

x. Quel type de formation en cours d'enseignement avez-vous suivi en matière de TIC ?

- Cours de courte durée (une semaine ou moins)
- Cours, atelier de vacances en informatique
- Atelier

xi. Combien d'heures par semaine sont consacrées aux TIC et aux DET (Didactique et technologie éducative) dans votre emploi du temps ?

TIC : a) une heure b) deux heures c) trois heures

DET : a) une heure b) deux heures c) trois heures

xii. A votre avis, la durée hebdomadaire des TIC et des DET est-elle suffisante pour couvrir le contenu requis ?

- Oui
- Non

xiii. Avez-vous une heure spécifique pour les cours pratiques de TIC ?

- Oui
- Non

PARTIE B : ÉLÉMENTS DU QUESTIONNAIRE

PLANIFICATION DES POLITIQUES ÉDUCATIVES DU PROGRAMME DES TIC ET SES EFFETS SUR LE DÉVELOPPEMENT PROFESSIONNEL DES ÉTUDIANTS.

Instructions : Veuillez évaluer les différents aspects de la planification des programmes de TIC (Technologies de l'Information et de la Communication) en fonction de votre degré d'accord avec les différentes déclarations en cochant « √ » l'une des cases suivantes :

TAD= Tout à Fait d'Accord (4/4), A = D'accord (3/4), PA = Pas d'accord (2/4) et PTA = Pas du Tout d'Accord (1/4).

No	DÉCLARATION	TAD	A	A	PTA
	SECTION A: NORMES DE PLANIFICATION DU PROGRAMME DES TIC **La planification suit des normes spécifiques pour la rendre efficace. Ces normes formulées aux niveaux national et international sont ensuite décomposées.**				
01	Les lois sur l'éducation sont pertinentes pour faciliter l'acquisition des connaissances des étudiants sur les TIC				
02	Les objectifs du programme des TIC favorisent le développement des compétences des étudiants				
03	Les méthodes d'évaluation des TIC visent à améliorer les compétences des étudiants				
04	L'utilisation des instruments externes dans le programme des TIC réduit les performances académiques des étudiants.				
05	Les réformes des TIC ont grandement influencé l'acquisition par les étudiants des connaissances du programme TIC				
	SECTION B : PROCESSUS DE PLANIFICATION DU PROGRAMME DES TIC **Le processus de planification dans la planification considère une procédure étape par étape dans la planification.**	**TAD**	**A**	**A**	**PTA**
06	Le diagnostic des besoins de la société a facilité l'acquisition des connaissances des étudiants sur le programme des TIC.				
07	La mise en œuvre efficace du programme des TIC en classe favorise la qualité des compétences développées par les étudiants				
08	Le suivi de l'exécution du programme TIC en classe augmente les performances académiques des étudiants				

	dans les TIC et les DTE (Didactiques des Technologies Educatives)				
09	Les matières TIC et DET sont fréquemment évaluées dans nos écoles normales afin de renforcer les compétences des étudiants dans la société.				
10	Les étudiants ont acquis des connaissances limitées du programme TIC en raison d'une mise en œuvre inefficiente.				
	SECTION C: CONTEXTE DE PLANIFICATION DU PROGRAMME TIC **Le contexte renvoie ici à la situation environnante qui doit être prise en compte lors de la planification.**	**TAD**	**A**	**A**	**PTA**
11	Aborder le niveau financier du Cameroun lors de la planification du programme des TIC contribue à l'épanouissement des connaissances des étudiants.				
12	Les enjeux sociopolitiques au Cameroun augmentent la qualité des compétences développées par les étudiants dans le cadre du programme des TIC.				
13	Une fois la situation sanitaire prise en compte dans la planification du programme des TIC, les performances académiques des étudiants seront améliorées.				
14	Le manque d'enseignants formés aux TIC contribue à entraver les compétences des étudiants.				
15	Les connaissances des étudiants en technologie seront adéquates si le contexte du programme des TIC est bien développé.				
	SECTION D: CONTRAINTES DE PLANIFICATION DU PROGRAMME DES TIC **Les contraintes sont les défis qui accompagnent le processus de planification du programme DES TIC.**	**TAD**	**A**	**A**	**PTA**
16	Les étudiants des instituts de formation des enseignants des zones urbaines acquièrent davantage de				

	connaissances dans le cadre du programme TIC que leurs homologues des zones rurales.				
17	Un programme TIC bien organisé favorise le développement des compétences des étudiants				
18	L'utilisation de différentes stratégies dans le programme TIC nuit à la qualité des compétences développées par les étudiants				
19	La pénurie extrême de technologies contribue à stimuler la performance académique des étudiants dans le programme des TIC				
20	L'acquisition des connaissances dans les TIC et les DET par les enseignants est très utile au succès du programme TIC dans les instituts de formation des enseignants				
	SECTION E : VARIABLE DÉPENDANTE **Développement professionnel des étudiants**	**TAD**	**A**	**A**	**PTA**
21	L'acquisition des connaissances des étudiants en TIC et en DET est motivée par les normes de planification du programme de TIC				
22	Le développement des compétences des étudiants en TIC est entravé lorsque les diagnostics efficaces ne sont pas posés sur les besoins sociétaux des étudiants.				
23	Les performances académiques des étudiants sont favorisées si le programme de TIC est adapté à une nature particulière afin de se conformer aux besoins des élèves-maitres.				
24	L'acquisition des connaissances des étudiants en TIC et en DTE a été entravée par les défis du programme TIC				
25	Les compétences des étudiants du programme TIC sont effectivement améliorées par le strict respect des étapes de mise en œuvre de l'APC (Approche Par Compétence) lors de l'enseignement.				

APPENDIX 11

QUESTIONNAIRE FOR TEACHER TRAINERS IN TEACHER TRAINING COLLEGES

Dear respondent,

I am Amombi Delphine Amana a Ph.D Student from the Faculty of Education, University of Yaounde 1. I am conducting research on the topic "*Educational policy planning of ICT program and its effects on students' professional development in selected Teacher Training Colleges in Cameroon*"

The **ICT Program** is the 2013 new syllabus of Teacher Training Colleges that saw the addition of Information and Communication Technologies (ICTs) and Didactics of Educational technologies (DETs)as new subjects. The survey is intended to help us associate the different levels of planning of the ICT program to the effectiveness of students' professional development and consequently improving on planning of ICT program of your area. Your confidentiality shall be maintained and your responses shall be used strictly for research purposes**.**

I would be very grateful if you fill this questionnaire as objective as possible.

Thank You for your cooperation

INSTRUCTIONS: Fill in the lines or tick ("√") the box option that corresponds to your school situation, option or practice.

PART A: PRELIMINARY INFORMATION

1. Demographic information

i. Region of origin_____Division_____Subdivision_____

ii. Gender: male ☐ female ☐

iii. Marital status: single ☐ married ☐ divorce ☐ widow/er ☐

iv. Institution: _____Division_____Region_____

v. Number of years in the teaching profession: 1-9 ☐ 10-19 ☐ 20-29 ☐ 30+ vi. Professional certificate ☐ Diploma ☐ Master degree ☐

Bachelor degree ☐ Doctorate (PhD) ☐

vii. Age Range: 20-29 ☐ 30- 39 ☐ 40- 49 ☐ 50- 59 ☐ 60+ ☐

2.Other Informations

viii. The Subject you teach in Teacher Training_____

ix. Was ICTs included in your education academic courses/ Subjects

Yes No

x. What kind of training while teaching have you undertaken in ICTs?

- Short courses (week or less)
- Computer Holiday classes, workshop
- Workshop

xi. How many hours do you have ICTs and DETs on the time table per week?

ICTs: a) one hour b) Two hours c) Three hours

DETs: a) one hour b) Two hours c) Three hours

xii. In your opinion, is the weekly duration for ICTs and DETs sufficient to cover the required content?

Yes No

xiii. Do you have any specific hour for ICT practical lessons?

Yes No

PART B. QUESTIONNAIRE ITEMS

EDUCATIONAL POLICY PLANNING OF ICT PROGRAM AND ITS EFFECTS ON STUDENTS' PROFESSIONAL DEVELOPMENT.

Instruction: Please rate the various aspects of ICT program planning in terms of the extent to which you agree with the various statements by marking a tick "√" on one of the following boxes:

SA=Strongly Agree (**4/4**), **A**=Agree (**3/4**), **D**= Disagree (**2/4**), and **SD**= Strongly Disagree (**1/4**).

SN	STATEMENTS	SA	A	D	SD
	SECTION A: PLANNING NORMS OF ICT PROGRAM **Planning follows specific norms to make it effective. These norms formulated at the National and the International levels are further broken down**				
01	The Educational laws are relevant in facilitating students' knowledge acquisition i of ICT				
02	The objectives of the ICT program promote students' development of Skills				
03	Assessment methods of ICTs are geared towards improving students' competence:				
04	The use of External instruments on the ICT program reduces the students' academi performance.				
05	ICT reforms has greatly influence students' acquisition of knowledge of the ICT Program				
	SECTION B: PLANNING PROCESS OF ICT PROGRAM **The planning process in planning considers a step-by-step procedure in planning.**	SA	A	D	SD
06	Diagnosing the societal needs has facilitated students' knowledge acquisition of the ICT program.				
07	Effective implementation of the ICT program in the classroom promotes the quality of skills developed by students				
08	Monitoring the ICT program execution in the classroom increases students' academic performance in ICTs and DETs				
09	ICTs and DETs subjects are frequently being evaluated in our Teacher training colleges so as to boost up students' competence in the society.				
10	Students have acquired limited knowledge from the ICT program due to inefficient implementation.				
	SECTION C: PLANNING CONTEXT OF ICT PROGRAM **Context here refers to the surrounding situation that should be considered when planning.**	SA	A	D	SD
11	Addressing the financial level of Cameroon when planning the ICT program helps in fulfilling students' knowledge.				
12	The socio-political issues in Cameroon increase the quality of skills students develop in the ICT program.				
13	Once health situation is considered in planning ICT program, students' academic performance will be improved.				
14	The insufficient trained teachers in ICTs contributes in hindering students' competences.				
15	Students' Knowledge in technology will be adequate if the context of the ICT program will be well developed.				
	SECTION D: PLANNING CONSTRAINTS OF THE ICT PROGRAM **Constraints are the challenges that accompany the planning process of the ICT program**.	SA	A	D	SD
16	Students in the Teacher Training Colleges in the urban areas acquire more knowledge in the ICT program than their counterparts in rural areas.				

17	A well-organized ICT program promotes students' development of skills				
18	Using different strategies in the ICT program hinder the quality of skills students develop				
19	Extreme shortage of technologies helps in stimulating students' academic performance of ICT program				
20	Knowledge acquisition in ICTs and DETs by the teachers is very helpful to the success of the ICT program in Teacher Training Colleges				
	SECTION E: DEPENDENT VARIABLE **Students' professional Development**	SA	A	D	SD
21	Students' knowledge acquisition in ICTs and DETs are motivated by the norms of planning of the ICT program				
22	Students' skills development in ICT is hindered when effective diagnoses is not made about the societal needs of students.				
23	Students' academic performance is promoted if the ICT program is tailored in a particular nature so as to conform to the needs of student teachers.				
24	Students' knowledge acquisition in ICTs and DETs have been hindered by the challenges of the ICT program				
25	Students' competences from the ICT program are effectively improved by strict respect of the implementation stages of the CBA when teaching.				

APPENDIX 111

INTERVIEW GUIDE FOR REGIONAL INSPECTORS OF COMPUTER SCIENCES IN SECONDARY EDUCATION

Dear respondent,

I am Amombi Delphine Amana a Ph.D Student from the Faculty of Education, University of Yaounde 1. I am conducting research on the topic "*Educational policy planning of ICT program and its effects on students' professional development in selected Teacher Training Colleges* (TTCs) *in Cameroon*"

The **ICT Program** is the 2013 new syllabus of Teacher Training Colleges that saw the addition of Information and Communication Technologies (ICTs) and Didactics of Educational technologies (DETs) as new subjects. The survey is intended to help us associate the different levels of planning of the ICTs program to the effectiveness of students' professional development and consequently improving on planning of ICTs program of your area. Your confidentiality shall be maintained and your responses shall be used strictly for research purposes**.**
I would be very grateful if you fill this questionnaire as objective as possible.

Thank You for your cooperation

SECTION A: PLANNING NORMS OF ICT PROGRAM

Planning follows specific norms to make it effective. These norms formulated at the National and the International levels are further broken down

1. Why do you think planning of ICT program must follow standardized measures_____

   _____

2. What are some of these standardized measures that can influence students' professional developments as concerns the ICT program?

   _____

3. What are some laws that can be applied when planning ICT Program in teacher training colleges

   _____

SECTION B: PLANNING PROCESS OF ICT PROGRAM

The planning process in planning considers a step-by-step procedure in planning.

4. What are some societal needs that must be considered when planning ICT program in Teacher Training colleges that will help in students' knowledge acquisition?

_____

_____

5. According to your viewpoints what has been the contributing factors to effective implementation in the classroom of the ICT program in Teacher Training colleges.

   a- How have the factors above contributed in students' teachers' professional development?

_____

_____

   b. Why do you think that the evaluation procedure of ICT program in Teacher Training colleges is not properly carried out?

_____

_____

   c. Mention the steps that have been carried out as it concerns monitoring the effectiveness of ICT program in Teacher Training colleges.

_____

_____

SECTION C: PLANNING CONTEXT OF ICT PROGRAM

Context here refers to the surrounding situation that must to be considered when planning.

6. Explain how the various resources below have contributed or hindered students' development of computer skills, competences, academic performance.

   a- Trained personnel

_____

_____

   b- Financial resources

_____

_____

   c-Material resource

_____

_____

d- Socio-political resources

_____

_____

SECTION D: PLANNING CONSTRAINTS OF THE ICT PROGRAM

7. What roles does the nature of the environment (urban and rural) and the organization of the ICT program play in promoting the various aspects below

- students' competencies

_____

_____

- students' knowledge acquisition needs

_____

_____

-skills students develop

_____

_____

8. Mention some challenges that the ICT program in Teacher Training colleges is facing

_____

_____

a. How have the problems above been solved so far?

_____

_____

APPENDIX IV: INTERVIEW TRANSCRIPT

Theme 1: Planning ICT program and students' competence development

Preliminary Information

Question 1: What do you know about the 2013 ICT teacher training program?

First Response: I know the 2013 ICT training program is based on two key aspects; improving student teacher's knowledge on the manipulation of ICT tools and on how to integrate them in planning and teaching content in any subject area.

Second Response: I know it is an ICT program implemented to give student teachers basic knowledge on ICT and equally equip them to teach ICT in the nursery and primary schools in future.

3rd Response: 2013 Teachers training program was a program introduced in the teacher training colleges that students are supposed to master both practical and theoretical parts of Information and Communication Technologies.

4th Response: I know there is subject on the program call ICTs but the content is obsolete.

5th Response: What I know about the ICT teacher training program is that the implementation is completely theoretical than practical. Perhaps the primary course is the teacher. I am thinking that the program should be more practical based.

6th Response: I know the program exist but Lack of trained personnels and equipments hinder the effectiveness of the program. This program is aim at developing professionalism in student through the use of ICTs. ICT as a subject causes the student teachers to be highly performant, reflective and open to the world.

Question 2: What do you think is competence Development?

1st Response: Professional development in this context is the acquisition of the knowledge and skill required to plan, present lessons and manage the classroom effectively especially in an ICT oriented learning environment.

2nd Response: Professional development is all about instilling skills (practical skills) which learners can use in the society in the future. Causing their skills to be able to practically do things and pick up a job in the future.

3rd Response: The process of nurturing an individual so much so that he or she possesses a level of competence that enables he or she to exercise a profession with little or no difficulty. And that they could maximize the use of so many ICTs.

4th Response: It is the mechanism put in place to ensure continuous effectiveness and efficiency of teachers.

5th Response: Professional development simply put is an advancement of somebody's way of practicing a particular profession. That means if teacher with difficulties now teach with certainty. Professional development happens with further training which could be out or in the work place. Experts could be brought in to upgrade students and that constitutes professional development.

6th Response: It is a deliberate process by which someone add value to what he or she can do best.

Question 3: How do you think the ICT program in the teacher training college have influence competence development of student teachers?

1st Response: I think the program has an influence on professional development of student teachers when effectively handled as it improves their knowledge and skill in the use of ICTs in teaching and evaluation of learning.

2nd Response: The ICT program has had great impact in professional development of student teachers. This is because the students by the end of the Teacher training course have to go through ICT and Didactics of Educational Technologies. They are required to master the content of the subjects and go a long way to do practical. It therefore means that skills and knowledge add to the students since 2013

3rd Response: With the teaching of this practical subject call ICT, many students are now able to apply the knowledge acquired in using ICTs. They can effectively use traditional tools like gongs, drum etc. to pass information while those in the towns use sophisticated/ multimedia modern tools like laptops, multimedia phones etc. to teach their lessons. The planning of ICT program positively affects students' professional development with this knowledge students have changed their paradigm and are now able to pass this knowledge to younger students.

4th Response: It thus, to a less extent in that graduating student teachers are now better sensitized on the importance of being a computer literate.

5th Response: The ICT teacher training program has a positive influence on professional development of student teachers. A student who learns without ICT tools differs from a student who have not. It opens the minds and scope of student teachers. If a student can use a projector to teach, then he or she is doing better than another student teacher who is not using it. A student teacher who is knowledgeable in ICT will have more ICT materials especially from the internet than another student teacher who is not knowledgeable.

6th Response: Lack of didactics material to assist in pursuing the program. Location of training schools in various regions and divisions has enhanced development of ICT skills for some students. This program reinforces the capacity of student teachers in field.

Question 4: What can you say as concerns the planning of the ICT program?

1st Response: For the planning of the ICT program, I think effective measures were not put in place during planning to provide the necessary equipment and prepare teacher trainers in handling the subject

2nd Response: Its plan so much that learners are able to acquire the basic elements as far as ICT is concerned. The program / syllabus consists of basic elements that enhances the acquisition of basic notions of ICT. If this is done effectively, student teachers will be better trained professionally.

3rd Response: With respect to the planning of ICT programs in TTC, students are involved both in theory (content) and practical. Many ICT laboratories in some of TTCs have been used by students to actually study what they learned in the classroom. These two dimensions enable the student teachers to effectively perform their duties. Like other disciplines, the planning of ICT must follow the academic calendar of the year

4th Response: It does not take into consideration effective online teaching.

5th Response: It was well planned but not contextualized. In GTTC Nkambe there is no electricity for example for students to effectively apply ICTs. The program did not make ample provision of materials for rural areas. In Cameroon, network and electricity power supply is not available in most rural areas.

6th Response: Assessing the level of development of the society prior to laying the framework was not well carried out before planning the ICT program. There is total lack of computer laboratories and accessories. There is also improved number of trained teachers.

Theme 2: Planning norms and students' competence development in ICTs.

Question 5- How are some laws (for example the 1998 law of education) used in planning ICT program so as to foster student teacher's knowledge?

1st Response: We are still to have a concise ICT policy on education in Cameroon and a Law like the 1998 Orientation law on education merely mentions in article 25 that education provided shall take into consideration scientific and technological advancement to follow prevailing trends but does not emphasize how this will be effectively carried out. As a result of this objective which was not well spelled out, students have not had much knowledge in the various ICTs.

2nd Response: The educational law of 1998 wants citizens who are deeply rooted in their culture and open to the world. Its only through ICT that we can be open to the world (globalization) thus enhancing students' knowledge. laws used in ICT planning involves the law on school orientation, the National Strategy on the Regulation of ICT, Education and training strategy 2015.

3rd Response: The laws involve in ICT planning exists and I don't know the laws. Planning is done at the higher administrative level. In Cameroon planning is done at the level of top to bottom. It is at the high level that planning is carried out. The foundation text is the 1995 law which states in its article 5 that students should be open to through science and technology.

4th response: I have not seen a place where the law really emphasis the use of ICT's in the teaching and learning process and therefore there have not really been a significant additional knowledge in ICT to students

5th response: That is the lone law when it comes to governing education in Cameroon. The objective of education as stated by this law says education should enable the student to be holistic, deeply rooted in his culture and open to the world. This mission is embedded in the ICT program. To be open to the world has to do with ICTs. It helps our students to get more information that can help them develop mentally. It helps the students to know what is happening in other places. If it is well implemented with respect to the 1998 law, then student teachers will benefit more. This program opens the mind of student teachers not only to use traditional tools (which have to do a lot with our culture) or focus only on text books which can be out dated.

6th Response: laws used in ICT planning involves the law on school orientation, the National Strategy on the Regulation of ICT, Education and training strategy 2015. External instruments that can be considered in interview guide, research to be conducted and evaluation exercises.

Question 6: Why is there need to insist on the demonstration of mastery when planning ICT program in the teacher training colleges?

1st Response: It is when student teachers demonstrate mastery that it can be confirmed that competence has been acquired in the domain. If learners are able to demonstrate mastery, then acknowledge of knowledge has taken place.

2nd Response: Learners need to master ICT so as to be able to use it efficiently in the future as well as to be able to teach others. Teaching others show they have gain in knowledge.

3rd Response: There is need to demonstrate mastery in everything one does. Therefore, teaching cannot be left out. It is important to master techniques, methods etc. and therefore mastery comes with effective planning.

4th Response: ICT is a tool that every teacher must make use of in order to remain valid.

5th Response: There is a great need to insist on the demonstration of mastery. Planning is like setting the ball running: - setting the channel through which the ball will roll and setting the place to which the ball will go to. So, if the person planning does not have mastery for what he or she is planning certainly he or she is planning a different thing. So educational planners must collaborate with ICT specialists so that the program should not only be pedagogic but professional. There is actual need for mastery in planning. The planning should come in two phases: - expertise on ICT itself and expertise in pedagogy if not good ICTs can be placed on wrong ways of teaching.

6th response: Demonstration of mastery is a method of teaching that should be used on a practical discipline like ICT. Demonstration of mastery has to do with showing the learners the potential ways of carrying out an activity or doing something because it gives the student knowledge which will help them develop those particular skills. Therefore, a mastery of demonstration during planning of ICT in teachers training college is very important not only because it will facilitate the learning of ICT but this teacher will also facilitate the teaching in the future.

Question 7- What assessment methods should be used to dictate students' performance and skills development when planning ICT program in the teacher training colleges?

1st Response: Student teachers should be tested theoretically and practically. Practically, they must demonstrate mastery in operating basic ICT devices used in teaching by effectively integrating them to teach lessons during teaching practice before answering theoretical questions during final examination on ICT. This kind of assessment favor mastery of content and thus professional development.

2nd Response: Practical assessment methods where learners will be able to demonstrate skills and mastery of content. When these skills and content are achieved then professional development is eminent.

3rd Response: Assessment methods are use in planning ICTs in TTCs are so many, since students are involved in the theory and practical parts of ICTs, then they should also be evaluated at such. They should write test and exams from where their skills should be measured.

4th Response: Practical, creative and innovative methods should be used to make students score better in ICT and therefore professional development.

5th Response: The best assessment method here is placement, that is trying to know what they know and not know about ICTs. This involves knowing what level the learners are and all these will facilitate students' performance and skills development**.**

6th Response: To check how far learners have achieved knowledge gained from the subjects' ICTs and Didactics of Educational Technologies they should give them written and practical test in all short, medium and long-term evaluation exercises of the teacher training college.

Question 8: What external instruments should be considered in planning ICT programs in teacher training colleges that help student teachers to develop skills?

1st Response: External instrument that can help in ICT planning could be ICT policies in other African countries. These policies can be compared with other policies and consequently inspiration can

be gotten.

2nd Response: Computers and internet services.

3rd Response: Planning should consider the different peculiarities between the urban and rural schools. This will enable the students in the rural areas to benefit knowledge and skills that will be used for teaching.

4th Response: Globalization and local realities

5th Response: Apart from local realities, other external instruments could be employed. There is need to do a comparative analysis of what has succeeded in other countries or systems. The possibility of employment in and out of our locality should be verified so that children can excel in other areas or domains.

6th Response: As concerns international norms, UNESCO as an international organization has brought up a series of guidelines on not only the teaching and learning of ICTs but also its usage. Therefore, if international guidelines are taken into consideration, it would help in effective planning and consequently would help in professional development of student teachers. The measures put in place by UNO in order to ensure that standards cut across.

Theme 3: Planning process and students' competence development in ICTs.

Question 9: What aspects of societal needs should be diagnosed when planning ICT program in teachers training colleges aimed at improving students' knowledge, skills and academic performance?

1st Response: Societal needs in relation to ICTs like access to information about health, research etc. using ICTs, role of ICT in improving local business, respect of ethics and living together.

2nd Response: The aspect of being able to carry out research out of the classroom to learn and do assignment with the use of the internet. If these students are able to carry out assignment with the use of the internet therefore their performance, skills and academic performance will witness a great turn around.

3rd Response: Today, scientific development has improved so much so that things almost happen in seconds. Some aspects of societal needs should therefore be considered in planning the ICT program. One discovers that during this corona virus pandemic period, there have been the resistance to avoid human contacts (physical distancing). In addition, I saw a video how in Uganda drone was use to deliver goods from one place to another. Therefore, the question now that educational planners should be considering is how instruction should be made easier?

4th Response: All aspects of society needs should be considered as this will make student improve on their general performances and cause them gain much skills.

5th Response: Our natural resources in the community should be of great concern. Planners should consider production which has to do with recycling. If we have more of timber companies, ICT programs should be tilted towards providing jobs in the community. So, whatever they learn, the knowledge will be useful. The culture of the people is another societal issue.

6th response: The political climate instills fear in the students thereby hindering their development of computer skills.

2- Question 10: What evaluation procedures should be considered when planning ICT programs in teachers training colleges that fosters student's competence development?

1st Response: During planning, there should be pilot testing of the main aspects. Stake holders should also be involved to evaluate the proposals made before the final program is approved.

2nd Response: Students' teachers should be practically evaluated. There should be able to sit in front of the computer and carry out assigned task, do assignments etc.

3rd Response: There should be hands on (practical demonstration) and theoretical. Since these students are taught ICTs and attempts are made to take them to the ICT laboratory for practical, there is also need to evaluate them in the two ways. So, these should be considered in planning ICTs in TTCs as it will help to boast up the students' knowledge in ICTs and even practical procedure

4th Response: Need assessment-objective-need/activities-monitoring and evaluation (cyclical). Evaluation must follow what the students know and what they can do in other words; it should follow the Competence Based Approach. Written evaluation and evaluation in the computer laboratory and even through the internet should be practiced.

5th Response: Evaluation is a test to see weather objective set was met. During planning, we must look at objective of ICT program from the students' performance and skills development check or control mechanism (short, medium and long-term) to see the progress. For example, objectives can be stated as such: -

-short-term =identify various parts of the computer

-medium term =turn on computer

-long term=type and print document

The medium term can be successfully achieved if the short term is attained. If you don't put check mechanisms, you may at the end discover many problems.

6th response: We should start with diagnostic evaluation so we can understand the need of the students, teacher and the society. The program should be student oriented and should be teachable and it should solve the need of the society. Formative evaluation is another one that could be done that is during designing and implementing during and after the program. This constant evaluation would give feedbacks on which amelioration should be done. And if these ameliorations are done, it will turn to increase professional development of student teachers. Summative evaluation by the end of the term will verify the attainment of objective. During the planning process every stage should be evaluated. This is to ensure it serves the purpose for which it was planned and therefore would facilitate skill enhancement in graduating students.

Question 11: How should monitoring be carried out when planning ICT programs in teacher training colleges in order to influence students' competence development?

1st response: Monitoring should be done at least three levels: by inspectors from the national level, those at regional level and heads of departments within the schools. Periodic reports on challenges, successes and recommendations should also be forwarded by the teachers to the regional inspectors for summary and onward transmission to the central service for action.

2nd Response: Students should be monitored by the facilitator when they sit in front of the computer to make sure they are doing what is required of them and not open unauthorized site. Thus, teachers must move round each time learners are working with the computer to be sure they are actually carrying out the assigned task. Every time learners are working on the computer; they should be monitored for this will help professional development.

3rd Response: Monitoring can be done in so many ways. For example, we can create so many online groups like block, whatsapp, instagram etc. these social medias can be used by the teacher and students to post messages, assignments while there is strict supervision. Supervisory heads can be appointed to follow or monitor participation in such a way that all students will find themselves be committed to work. Students can react to what others have done, followed by the teachers monitoring the students. Rules can enable a student to see that he or she is the only one who has not done his or her assignment.

4th Response: Monitoring should be throughout the implementation of the subject ICT in teacher training Colleges. monitoring of ICT programs should be done through inspection exercises, ICT gadgets and inspection forms to be filled.

5th Response: Monitoring has to do with objectives; it has to do with constant following up. Checking how it is being done. The method and content of teaching ICT should be closely monitored. Educational planners should describe the content and method the same way international programs are done. If it is not well prescribed, then implementation would be very difficult.

6th Response: Monitoring the various stages in planning is important that conception design implementation as well as evaluation in other to promote knowledge acquisition for leaners. In addition, Regional inspectors of computer science/ICT pay visits to TTCs.

Question 12: What implementation strategies should be highlighted when planning ICT program geared at building student teachers' skills?

1st Response: Pilot testing must be done, feedback collected and analyzed to make amendments, thereafter implementation in all schools. This feedback must involve student teacher's views as well as those of teacher trainers.

2nd Response: Make sure they are computer laboratory, so ICT should not be done theoretically but practically.

3rd Response: Implementation strategies are very important in planning ICTs in schools. Strategies include ICT laboratories, experts (in software and hardware) and ICT text books. These experts can be invited on special days to teach and present sensitive areas to students, teachers, and administration as it concerns ICT program planning.

4th Response: Practical teaching, supervision, feedback, modification as need be can be effectively practice. In other words, dynamic monitoring techniques should be employed.

5th Response: Implementation strategies should be based on the level of the learners. Materials must be defined or suitable to the level of learners. Local examples should be used to accompany teaching. Practical sessions should be strategized.

6th Response: Visit by team of inspectors, writing common examinations in ICT, regular reporting by the department and Seminars/ workshops should be organized frequently so that students should always remember what is taught in the class. At the final analysis students' professional development will be achieved.

Theme 4: Planning context and students' competence development in ICTs.

Question 13: Why should financial issues be considered in planning ICT programs with the aim of having an influence on students' knowledge?

1st Response: Financial considerations must be made because no program can be effectively implemented without finance to provide equipment, manuals, training of implementers and conducive environment.

2nd Response: To effectively carry out ICT studies in school, we need a complete lab; we need internet, all these can only be bought with money. So financial needs to be considered

3rd Response: ICTs are gadgets both traditional and modern ones. Off course the teachers would not fabricate these tools there should be well-wishers, sponsors, and people of goodwill who should provide these gadgets. A computer must have all the other components like electricity, desk, switches etc. all these tools are acquired with money that is why financial issues should be considered when planning ICT program.

4th Response: Money is needed at all stages: -planning, implementation, monitoring and evaluation. Using money at all stages will ensure that students have adequate materials and so improved performance.

5th Response: Money is the oil; it is the engine. Without money, the human and material resources cannot be acquired. Even if human resources are available and adequate, financing is still primordial. Financing the program can be done through Government subvention and the school should raise its own fund. The aim of the program is that students should teach better. Therefore, finance should be adequately available.

6th Response: ICT is a subject taught with tools such as laptops computers, projectors, computers and telephones. To acquire these tools, we need finances. If finance is not adequately planned for, then implementation would be more of theory than practice. Lack of ICT equipment's such as computers and accessories are due to financial problems in many teacher training colleges. This is a program that is very demanding so budgeting line should be affected if not success would be far-fetched

Question 14: How do socio-political issues influence the planning of ICT program?

1st Response: Once there is socio-political tension, planning is affected as required data could not be obtained, pilot testing will not be possible, stake-holders may not feel secured to participate.

2nd Response: In some areas, there is no electricity, thus making it difficult to carry out ICT; some areas have limited computers, so ICT cannot be effectively carried out as planned in the syllabus.

3rd Response: In any government, the hierarchy has put in place certain laws and regulations to be strictly followed which are called policies. One thing is clear, there are many aged workers in the state who supposed to be applying these related to ICT use but they are not dynamic. They are so stereotype in their traditional methods meanwhile the young generation are conversant with these new technologies but are not given enough time to practice. These old schools that are not ready to improve hinder effective professional development of student teachers. The society somehow remains stagnant because of this. There is need to work on the political ideologies of the nation with respect to ICT use.

4th Response: Ideology, managing of scarce means are socio-political issue that should be considered in order to meet the needs of the student teachers.

5th Response: The provision of finance is a political issue. If the country's socio-political atmosphere is stable, then there is the possibility of converting some finances to education. When there is tension, implementation suffers because the teacher would be very fragile. Consider the North West and South West regions presently, a teacher of course would be teaching with the head looking outside because of fear.

6th Response: ICT planning needs budgeting. When there is instability in country finances are diverted towards curbing instability. A typical example is the state of Cameroon where in the state uses a lot of money to solve the Anglophone crisis. Lack of official ICT textbook for students to use in studying is another political issue. Inability of students to master and use ICT tools (modem).

Question 15: Why do you think health should be considered when planning ICT programs in teachers training colleges and what is its effect on competence development?

1st Response: Effective learning cannot take place in a situation of poor health; therefore, health issues should be considered in program planning. Skills and knowledge of learners are only effectively developed when there is good health.

2nd Response: It only takes someone who is strong, fine and has a sound mind to be able to learn. So, health is important in learning

3rd Response: Health is very sensitive and should be considered since one can't learn when he/ she is sick. Health of the students, teachers, healthy environment etc. are very important. Especially students and teacher's health should be considered. Technologies that destroy the health of pupils should not be considered when planning. There are gadgets that cause too much radiation and can therefore affect health especially the sight. It is said that, it is the introduction of the 5G that has caused the Corona virus pandemic.

4th Response: To guarantee safety at work and even the safety of the student teachers.

5th Response: The health of both learners and teachers should be considered. If the teachers are over stressed, they would get tire and it would become difficult to implement the program. So, planning should take care of what should be taught, how it should be taught and suggested methodologies.

6th Response: Without health nothing can be done. This program prepares among other trades' health personnel. It would not be good that in this age of technology a program is practiced without considering health owing to the fact that these student teachers can be health experts tomorrow.

Question 16: Explain how the different resources (human, material, etc.) can influence the planning of ICT planning in teachers training colleges and what consequences does it have with students competence development?

1st Response: When diverse resources like human and material resources are used, learning is better enhanced. This is because student teachers will learn from a wide array of facilities and gain diversified ideas.

2nd Response: Humans: teachers need to be able to impart knowledge to the learners to influence their professional development. Materials: computer laboratories and internet services are required to influence learner's professional development

3rd Response: When there no experts to manage the gadgets, problem arise. So ICT tools should come with Expert knowledge. With this, students would be able to develop professionally.

4th Response: There are all enhancers of human personality development

5th Response: These aspects are prime. Human beings implement the program and materials are needed for implementation. If the human resource is not prepared, then how can we talk of implementation? Planners should check which materials would be use.

6th Response: Lack of trained instructors' leads to poor dissemination of ICT programs. Lack of expertise to develop appropriate programs. Many students lack ICT resources like desktop computers, laptops and multimedia telephones to study with so this hinders their development of computer skills

Theme 5: Planning constraint and students' professional development in ICTs.

Question 17: What are some environmental conditions that can influence student teacher knowledge which should be taken note of when planning ICT programs in teachers training colleges?

1st Response: Environmental conditions like availability of electricity, internet, computer equipment, network, enslavement of the locality concerned etc.

2nd Response: The environmental condition should be free from noise pollution and there should be a complete laboratory to enhance studying and knowledge acquisition. There should be electricity and internet service

3rd Response: Cameroon is vast, the North is very hot during the dry season, and some areas are humid, while some areas are very cold. The nature of ICT tool viz a viz the area where it should be used have to be considered. It is not enough to import tools from Japan, China to Cameroon, it takes further follow up. Mostly some tools come to Cameroon in a good state but after some time they no more work. Planning therefore should be considered so as to facilitate students benefit.

4th Response: Network availability, power availability, possession of necessary gadgets

5th Response: Rural areas do not have electricity supply so there is disparity in the implementation of the ICT teacher training program between rural and urban areas which should not be the case.

6th response: Exposure to the world of ICT would greatly influence competence depending whether you find yourself in a rural or urban environment. Environmental factors like rainfall and sunshine can adversely hinder the use of ICT gadgets and so retard students' skills in ICT. Students in the rural areas find it difficult to acquire competence in ICT due to poor connectivity and electricity supply. Environments are not conducive for knowledge acquisition.

Question 18- What nature of the organization affects skills development of student teachers that must be considered when planning ICT programs in teachers training colleges?

1st Response: When all decisions in planning follow top to bottom approach, such a centralized organization will negatively affect implementation and learning. Those at the base must be fully involved. This is to ensure that students are the first to benefit from the program.

2nd response: Student teachers should each be entitled to a computer during lesson to enhance understanding. Student teachers should learn in a computer laboratory with electricity and internet service. The Content of ICT as a subject should be logically arranged to follow sequence that is from simple to complex, from concrete to abstract (horizontal). If the content is organized in this way, then students will retain knowledge learned in class and consequently students' professional development will be guaranteed.

3rd Response: Some ICT tools can be used in a group like the computer while others can be used as individual like the mobile phone. Still, some like laptops can be used together with the projector to presents lessons to a large group. A small gadget can mostly be used in small group sizes while big ones can mostly big class sizes.

4th Response: There should be Specialization when planning in that each person should specialized in one domain. Meanwhile bureaucracy and jack of all trade, master of known phenomenon should be avoided.

5th Response: When targeted competencies and skills to be developed are arranged from simple to complex, concrete to abstract etc. definitely the student would learn faster. It is better to develop the skill of putting off the computer before typing. That sequential arrangement of program is very important.

6th Response: Many stakeholders should be involved in organization. Inability of many stake holders to be involved is disadvantageous to the business. The organization of ICT program will have a great influence on students' knowledge acquisition if many are involved in the planning.

Question 19: What are some strategies/factors that hinder student teacher's academic performance which must be considered when planning ICT programs in teachers training colleges?

1st Response: Teaching practical lessons theoretically, using models instead of the real ICT equipment must be considered when planning as they may hinder effective implementation.

2nd response: Make sure lessons are interesting and reflect the needs of the learner's society so that they can see the importance of studying ICT and this will enhance their academic performance. Equally a lot of theory be avoided, because it will only be boring and cumbersome to student teachers hence affecting their performance.

3rd Response: Make sure lessons are interesting and reflect the needs of the learner's society so that they can see the icons be used as individual like the mobile phone. Still some like laptops can be used together with the projector to presents lessons to a large group.

4th Response: Availability of expert teacher trainers in ICT is far fetch so one major strategy in improving students' skills and knowledge in ICT acquisition is developing a sound training program in human resources for the schools. Lack of resources (material, financial, human) should have a solution.

5th Response: Factors and strategies that should be considered are many. Availability of resources and socio- economic factors are some examples. Students in rural areas having socio-economic background problems should be given materials. Programs like ICT which is seemingly a new field should be taught in the morning.

6th Response: Developing or upgrading the ICT program regularly is another program that boost student's professional development.

Question 20: How should the nature of technologies be considered in planning ICT programs and how can it affect student's competence **development?**

1st Response: Technologies have a cultural and environmental background that must be considered during planning. What is accepted in one culture may be a taboo in another. Also, consideration must be made on how to provide energy for electronically-driven ICTs, their size and weight to ease transportation to remote areas

2nd Response: The nature of technology should be considered. This is because the nature of technology is at the center of ICT and when learners understand and can use these different levels of technologies then they will have more skills and knowledge in ICT.

3rd Response: Technology should be considered base on the context. We cannot place a large computer in a very small space. The space should be well arranged before ICT tools are brought especially because some are so sophisticated that if great care is not taken it can be damaged so easily.

4th Response: It should be user friendly, environmentally friendly, it should be morally friendly

5th Response: Technology should be flexible in nature; it should be both manual and electronic or digital. It could also be mechanical. Planners should not only provide electricity but generator and even solar in that case rural areas can better benefit from ICTs if solar energy is developed.

6th Response: The nature of technology should be considered in that ICT goes with many complex infrastructures like generators which are expensive to buy and managed. It is therefore important to consider since Cameroon does not have steady supply of energy.

APPENDIX V: The 2014 ICT Syllables of GTTCS

REPUBLIC OF CAMEROON
PEACE – WORK – FATHERLAND
****
MINISTRY OF SECONDARY EDUCATION
****

OFFICIAL SYLLABUSES
FOR TEACHER TRAINING COLLEGES
(T.T.C.)

LEVEL: ONE-YEAR COURSE

MINESEC 2013

CONTENT

Foreword

Cameroon Syllabuses of the 21st century.

At this done of this millennium, a moment when Cameroon faces the height of its attainment on the emergence horizon of 2035, secondary education is faced with a number of challenges. Notably:

(i) To offer, in a context characterised by a high growth in enrolment in the primary sector, quality training to maximum of young Cameroonians ;

(ii) To prepare them, with the help of pertinent teaching/learning approach, to integrate in the world and confront a job market becoming more and more demanding.

On the other hand, training devices, in their conception and their implementation, have significantly evolved. Mean while in the old schools which concentrated mainly in the acquisition of knowledge that most often were not contextualised, substituted all over the world, with the worry to equip the learners to be able to face the complexities, diversities and challenges of real life. Therefore in the place of a school cut off from society, comes one which is integrated and worried about a sustainable development that takes into account cultural and local experiences.

The realization of this new school registered in the education Law of orientation and the necessity of a socio-professional insertion requires an adoption of a pedagogic paradigm to draw up school syllabuses in line with the Competency-Based Approach using life skills.

In this perspective, the New syllabuses for General Education, that of Teacher training and the referential for training for Technical Education, constitutes this great innovative movement of our educational system and in direct link with the orientations in the Growth and Employment Strategy Paper (GESP) that outlines from now till 2020, to provide minimum knowledge for all Cameroonian at the level of the first **cycle of secondary education.**

These Syllabuses define, in terms of Knowledge, skills, attitudinal-knowhow, essential competences that must be acquired by students in the course of the first cycle of the secondary Education. Thus, it clearly gives orientations to teachers on how to organise pedagogic activities.

While congratulating the writers of these syllabuses, I call on all the members of the education community, especially teachers to use the new paradigm, to effectively implement it, in order to make of it a profitable success to our educational system and, for our country Cameroon.

THE MINISTER OF SECONDARY EDUCATION

SUBJECT : DIDACTICS OF EDUCATIONAL TECHNOLOGIES **LEVEL :** ONE-YEAR COURSE	**WEEKLY TIME ALLOCATION** : 01hour **ANNUAL TIME ALLOCATION:** 22hours

Targeted competences: C11, C12; C13; C42.
Terminal competence: At the end of the course, the student- teacher should be able to prepare and conduct his teaching /learning activities, by integrating pedagogic Innovations to solve problem-situations.

COMPETENCES	BASIC PROFESSIONNAL COMPETENCES	THEMES	RESOURCES
C11 -Plan and facilitate learning/teaching activities	Solve problem-situations making proper use of educational technologies tools in school.	General Introduction	**KNOWLEDGE:** **-**Definition of concepts: Didactics, educational technologies, Potential cognitive tools, pedagogic resources, computer, software, learning scenario, internet, information, communication, didactic situation, targeted situation. -Importance of Didactics of Educational Technologies in the training of student-teachers; -Importance of educational technologies in the training of student-teachers; -Formulation of objectives level by level; -Advantages and disadvantages of integrating educational technologies in the teaching/learning process; **SKILLS:** -Define the above concepts; -Explain the importance of each of the concepts in the teaching/learning process; - State objectives level by level; -Clearly state the advantages and disadvantages of integrating educational technologies in teaching/learning process; **SUGGESTED ACTIVITIES:** **-**Documentary research.
		Potential manual and cognitive tools.	**KNOWLEDGE:** -Definition of concepts: exerciser, tutorial software, educational software, light pen and demonstrator; -Identification of traditional, communication and information tools: tom tom, drum, gong, xylophone; chordophone ('Mvet') etc…, - Identification of modern communication and information tools: telephone (mobile and fixed), radio, fax, tape recorder, internet, television etc. -Teaching tools: interactive whiteboard, light pen, educational software, tutorial software,

COMPETENCES	BASIC PROFESSIONNAL COMPETENCES	THEMES	RESOURCES
			calligraphy (artistic writing), demonstrator, exerciser; - Information research tools: search engine (web sites like google, yahoo etc.) encyclopedia and electronic dictionaries (wikipedia, encarta, dico-media), electronic directory, refereed journals, meta-engine etc. **SKILLS:** -Define the above concepts; -Differentiate the tools used in educational technologies -Explain the pedagogic role of these tools in improving on the teaching / learning process; - Effectively use these tools in varied class situations. **SUGGESTED ACTIVITIES** -Documentary research; -Practical exercise -Problem solving; -Educative games for socialisation and problem solving.
		Integration of educational technologies in the teaching/learning process according to contexts	**KNOWLEDGE:** -Classic/traditional class environment; -Multimedia environment; (computers with internet), and other pedagogic resources; -Computer laboratory. **SKILLS:** -Organise work in a classic/ordinary class (produce didactic materials/tools adapted to the environment and also use invariant methods; -Use materials/tools on different class situations; -Organise work in the Multimedia room; -Organise work in the computer room with computers and their peripherals, educational software (Graphics, Text editor, Spreadsheet, Publisher, Photoshop, PowerPoint etc.) **SUGGESTED ACTIVITIES:** -Drawing technological tools, -Producing didactic materials/tools adapted to lessons;

COMPETENCES	BASIC PROFESSIONNAL COMPETENCES	THEMES	RESOURCES
			-Practical exercises on internet; -Downloading documents (video, text, image); -Connecting classroom computers to a local network; -Assembling videos and animated images; -Typing, editing and printing; -Arithmetical calculations and statistics on the spreadsheet; -Sending and receiving of mails; -Research; -Solving problem-situations.
C12 - Organise class work according to various situations adapted to learners	Prepare and present lessons using educational technologies in the context of CBA.	Methods, techniques, procedure, model, style and lesson notes	**KNOWLEDGE:** -Definition of concepts: Teaching method, style, techniques and procedure; - Model teaching: • Task-based model; • Cooperative/collaborative / individualised model -Teaching styles with ICT: • Face to face/direct teaching; • Presentations and discussions; • Discussion forums; • Distance teaching; • I/FOAD/Tele learning; • Tele or video conference -Techniques of animating an educational technologies class: • Video pedagogic animation; • Experiential learning with a simulator; • Demonstrative technique; • Group discussion technique ; • Planning and structured content technique; • Interactive Technique; • Investigation techniques (direct or computer-assisted observation). -Documentary research, inquiry or virtual network visit. **SKILLS:** -Establish a link between methods, techniques, procedure, model and teaching styles with educational technologies; -Formulate problem-situations related to school and daily life situations; -Put in place a didactic scenario;

COMPETENCES	BASIC PROFESSIONNAL COMPETENCES	THEMES	RESOURCES
			-Apply methods, techniques, procedure, models and teaching styles in educational technologies to various contexts; -Use appropriate methodology to prepare lesson notes integrating educational technologies; -Easily present lessons using educational technologies. **SUGGESTED ACTIVITIES:** -Documentary research; -Practical exercises; -Role-play; -Draw up a simulation schedule (protocol); -Simulation; -Problem-solving.
C13 - Produce and use appropriate monitoring/ supervision, evaluation and remedial education mechanisms C42: Amend educational practices taking into account changes and innovations	Efficiently evaluate students'learning using educational technologies in the CBA context.	Evaluation of learning with educational technologies	**KNOWLEDGE:** - Evaluation criteria with the use of educational technologies; -Construction of Items ; -Types of Items ; -Drawing up an evaluation guide; -Sources of information used by students, etc.) -Evaluation and measurement techniques ; -Situation of integration. **SKILLS:** -Construct different types of Items; -Conceive structured questions/tests -Conceive an evaluation and marking guide; - Define evaluation criteria using educational technologies; - Identify sources of information used by students. **SUGGESTED ACTIVITIES:** Integration exercices ; - Solving problem-situations ; -Traditional evaluation (Test for all); -Computerised evaluation; -Self-evaluation and self-marking exercises; -Elaboration of simulations ; - Simulations with discussion sessions; -Amendment of a model lesson ; -Remedial strategies.

DISCIPLINE : INFORMATION AND COMMUNICATION TECHNOLOGIES **LEVEL :** ONE-YEAR COURSE	**WEEKLY TIME ALLOCATION** : 02hours **ANNUAL TIME ALLOCATION** : 44 hours

Targeted Competences: C11, C12, C13, C22, C31, C32, C33, C41, C42
Terminal Competence : At the end of the course, the student-teacher should be able to solve problem-situations using resources from Information and Communication Technologies in order to teach Educational Technologies in primary and nursery schools.
NB: As all other sciences or Art, the teaching of ICT should be in the morning period to facilitate the mobilization of cognitive abilities.

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
C11: Plan and facilitate learning / teaching activities	Solve problem-situations making proper use of ICT tools in school	General introduction	**KNOWLEDGE :** - Definition of concepts: , Computer Science, Computer, Information, Software, communication, peripheral ; - Formulation of objectives level by level ; - Historical foundations and importance of ICT; - Structure of a computer (material and software); - Configuration of computer peripherals; - Study of reading and writing operations with the keyboard and the mouse, and their importance in pedagogy ; - Various types of breakdown related to the handling of computer equipment; -Development of maintenance and security strategies of computer equipment. **SKILLS :** -Establish the link between the concepts - Explain the objectives level by level - Study the methodology to elaborate a form ; -State and explain ICT advantages and disadvantages; - Present a brief historical background of ICT and its importance; - Describe the physical structure/ hardware(visible parts) and software(invisible parts) of a computer; - Describe the environment of a common operating system; - Explain the functions of each computer peripheral; - Apply the reading and writing operations using the keyboard and the mouse, and their importance in pedagogy ; - Differentiate various types of breakdown related to the handling of computer equipment; -.Develop maintenance and security strategies for computer equipment **SUGGESTED ACTIVITIES :**

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
			Practical work in computer rooms: **-**Exercises of concepts discrimination; - Documentary research; -desktop customization; -Practical work from theory lessons. - Connexion of peripherals.
C11: Plan and facilitate learning/teaching activities	Solve problem-situations basing on the management of an operating system	Functioning of an operating system	**KNOWLEDGE :** **-** Definition of concepts : operating system, resource, file, folder, directory, memory, file system, icon; -Characteristic components of an operating system ; -Roles of an operating systems ; -Various types of operating systems - Roles of an operating system; - Management of users sessions; - Management of files and folders; - A Study of the components of an operating system; -Exploiting operating system interface: Workstation, Start menu; -Block diagram of a computer. **SKILLS** : -Define and establish a link between the concepts ; -Present the characteristic components of an operating system ; -Identify the various types of operating systems; Identify the roles of an operating system; - Manage files and folders; - Manage users sessions; - Describe the components of an operating system; -Demonstrate knowledge of windows environment: Workstation, Start menu ; -Describe the functioning of a computer. **SUGGESTED ACTIVITIES** : **Practical work in computer rooms** -Development of a practical work protocol ; - Simulate with a computer to execute a task; -Micro-teaching using a computer -Documentary research ; -Presentation of research work ; -Practical exercises and problem solving ; -Turning a computer on and off ; -Configuration of a local network in a classroom; -Using a CD, DVD or a VCD drive; -Implement of reading, writing and calculation operations using the keyboard and the mouse; -Installation and uninstallation of software; -Drawing the block diagram of a computer ; -Application of pedagogic activities : create,

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
			manipulation, delete, rename, copy, move and save files and folders during different operations ; -Detection of corrupted files; -Application of reading and writing operations on files in various tasks.
C12: Organise class work according to various situations adapted to learners ; **C22**: Work in a team, collaborate with the hierarchy and the education community	Solve problem-situations basing on the knowledge of a computer/digital work environment	Knowledge of a computer / digital environment	**KNOWLEDGE** : -Information System components -The roles of the component of an information system ; -Implementation of the components of an information system; - Identification and use of storage devices; - Types of memories; - Treatment and circulation of information; -Description of basic treatment operations of information; - Information processing and information flow. **SKILLS**: - Differentiate the components of a computer system; -Explain the roles of components of a computer system; -Describe the implementation process of component of a computer system; - Operate the component of a computer system ; - identify and use the different storage devices -Identify the types of memories; -Describe the basic information operations; -Describe information processing and information flow processes. **SUGGESTED ACTIVITIES :** Practical work in computer rooms: -Documentary research ; -presentation of research work (presentations); -Information processing ; -Use of storage devices (USB drives, CD, hardware, magnetic tape, multimedia card) ; -Organisation and setting of ICT tools in an appropriate environment according to the context.
C22: Work in a team, collaborate with the hierarchy and the education community **C31:** Work in discipline, respect, deontology and professional	Solve problem-situations related to the production of digital documents	Production of digital documents /Professional office automation	**KNOWLEDGE :** **-**Definition of concepts : Production of text Document, Text treatment software: Word, Excel, Power-point, Publisher, Text editor,: -Importance and use of each data treatment software; -Presentation and Publication with computer; - Description of the graphical interface of a data processing software;

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
ethics.			**SKILLS :** -Define and establish a link between the concepts: -Explain the importance and use of each data treatment software; -Present and Publish with computer; - Describe the graphical interface of a data processing software **SUGGESTED ACTIVITIES :** **Practical work in computer rooms** **-**Documentary research , -Presentation of research work ; -Problem solving; -Typing and production of documents (administrative and private letters, students' report notes, bills, etc…) ; -Designing posters, leaflets, pedagogic documents, preparation forms lesson's schemes of work; -Production of students' best wishes and birthday cards; -Use of a spreadsheet to calculate a numerical value : median, average value, mode value, standard deviation using statistic formulas; -Statistics of students' marks to publish trends on a graphic, and interpretation of students' results ; - Using of publi-postage -Planning and facilitating a presentation document during pedagogic animation days and during classes/ lessons ; -Use of a camera for video or audio recording; -Insertion of graphics and tables in a text; - Image animations ; - Insertion of illustrations and tables in a text; -Description of the formatting procedure, saving and printing of a letter and other administrative documents; -Save and print documents
C31: Work in discipline, respect, deontology and professional ethics **C32:** Participate in the conception and the realization of socio-educational activities	Using Internet to solve problem-situations related to communication, legal, ethics and social issues	Internet technology and network etiquette	**KNOWLEDGE :** -Definition of concepts : Computer network, Internet, Search engine , e-mail, Electronic message system, Navigator/Browser, URL, http, web, www, Web Site, Network etiquette, -Importance of the use of the Internet and its services; -Various channels of communication ; -Description of the procedure (steps of creation of an electronic messaging account (save, send attached documents, read and send messages, delete a message etc.)

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
C33: Sensitize and accompany the education community in the domain of environmental protection			-Description of the downloading procedure of attached documents from an email; -Advantages and disadvantages of the Internet ; -Services offered by the Internet; -Role of browsers or navigators; -Sensitisation on the importance of services offered by Web sites in a school; -Communication of the research methodology through the web; -Development of research strategies ; -Various search engines and their roles on the research in the web; -Analysis of legal, ethical, cultural and social issues related to the use of ICT in education ; -Identification of the main legal problems related to the use of ICT: - Copyrights, cyber crime, piracy; - Respect of intimacy and private life. **SKILLS :** -Define and establish a link between the concepts; -Explain the importance of the use of Internet ; - Present the advantages and disadvantages of Internet ; -Present the services offered by Internet ; -Present the various current browsers; -Explain the importance of services offered by Internet sites in schools; -Communicate the research methodology through the Web ; - Develop research strategies on the web ; -Identify the various search engines and their role in the electronic research ; -Analyse legal, ethical, cultural and social issues related to the use of ICT in education ; -Identify the main legal problems related to the use of ICT : - Copyrights, cybercrime, piracy; - Respect of intimacy and private life. **SUGGESTED ACTIVITIES:** **Practical work: in computer rooms** - Documentary research - Presentation of research work (presentations) - Using an URL to access a Web site ; -Downloading (of a document, a film, a sound or an image) ; -Browse the internet to look for useful information; - Management of an electronic messaging account

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
			(Sending and receiving an email to one or several recipients); -Connection of a school to an education forum ; -Creation of schools web sites ; -Using key words and operators on a research theme; - Evaluation of information sources used by students (relevance, accuracy) ; -Screening pernicious sites using the server to protect students against pedophilia, pornography and others ; -Creation of social networks (face book, You tube, Twitter, etc…) ; -Using network etiquette rules in one's profession -Settlement of conflicts related to social, ethical, legal and human issues;
C41: Analyse students' results and class performance to evaluate the pedagogic practices. **C42:** Amend educational practices taking into account changes and innovations.	Present lessons while integrating ICT following CBA from an elaborated form	Pedagogic integration of ICT in class practice and evaluation	**KNOWLEDGE :** -Definition of concepts : Pedagogic integration of ICT, pedagogic triangle, teaching ICT, teaching with ICT, teaching through ICT, pedagogic of the educational game, evaluation of acquired knowledge ; - Using ICT as object and as a pedagogic tool; -Using ICT as a catalyst in the learning/teaching process; -Contribution of ICT in the pedagogic triangle ; -Advantages and disadvantages of TIC in the learning/teaching process; -Formulation of objectives; - Formulation of problem-situations related to school life and daily life situations; -Sensitisation in the teaching of the other disciplines: mathematics, Environemental sciences, history, geography, Educational Policies, national languages, French, English and others using ICT; -Structuring a lesson following CBA; -Use of methods, animation practices, procedures, teaching techniques (refer to the Didactics of Educational technologies) (P.O GTTC); -Use of the methodology to make a lesson note; -Development of tools and evaluation strategies; -Identification of types of items; -Development of Items; -Efficient use of ICT for the evaluation of learning following CBA (automatic evaluator and automatic corrector software, drill and practice software) ; Identification of evaluation criteria using ICT; **SKILLS:**

COMPETENCES	BASIC PROFESSIONAL COMPETENCES	THEME	RESOURCES
			-Define and establish a link between those concepts ; -Use ICT as a pedagogic object and pedagogic tool during class practice; -Elaborate a lesson/class structure; -Use the methodology to make a class/lesson note; -Use methods, animation techniques, procedure, teaching techniques (refer to the Didactics of educational technologies) (P.O.GTTC); -Develop tools and evaluation strategies; -Identify the types of items; -Develop items ; - Identify the evaluation criteria using ICT tools ; **SUGGESTED ACTIVITIES :** **Practical work in computer rooms** -Documentary research ; -Presentation of work research (presentations); -Preparation of a tutorial protocol; -Micro-teaching using a computer; - Problem solving -Use of the appropriate method to make preparation forms for activities that integrate ICT ; - Easely present the class/lesson following CBA ; -Efficiently evaluate students' acquired knowledge using software (drill and practice software, automatic evaluation and automatic corrector softwares, demonstrators, calligraphers, simulators and computer applications; -Design structured questions; -Identification of evaluation criteria using ICT tools ; -Evaluation of integration and remedial activities; -Design an evaluation and marking guide (see Didactics of Educational technologies , P.O. TTC)

Article 2: The syllabus presented in Article 1 here above shall be implemented as from the beginning of the 2014-2015 school year;

Article 3: All previous provisions repugnant hereto are hereby repealed.

Article 4: Inspectors Coordinator General, the Director of General Secondary Education, the Director of Examination and certification, Regional delegates of Secondary Education, Divisional Delegates of Secondary Education, Education Secretaries of various Private Educations Agencies, Principals of public and private schools, each in their own sphere shall be charged with the strict implementation of this order which shall be inserted and published in the Official Gazette in English and French.

Yaoundé, 10 SEPT 2014

THE MINISTER OF SECONDARY EDUCATION

Le Ministre
The Minister

Louis Bapes Bapes

Copies:

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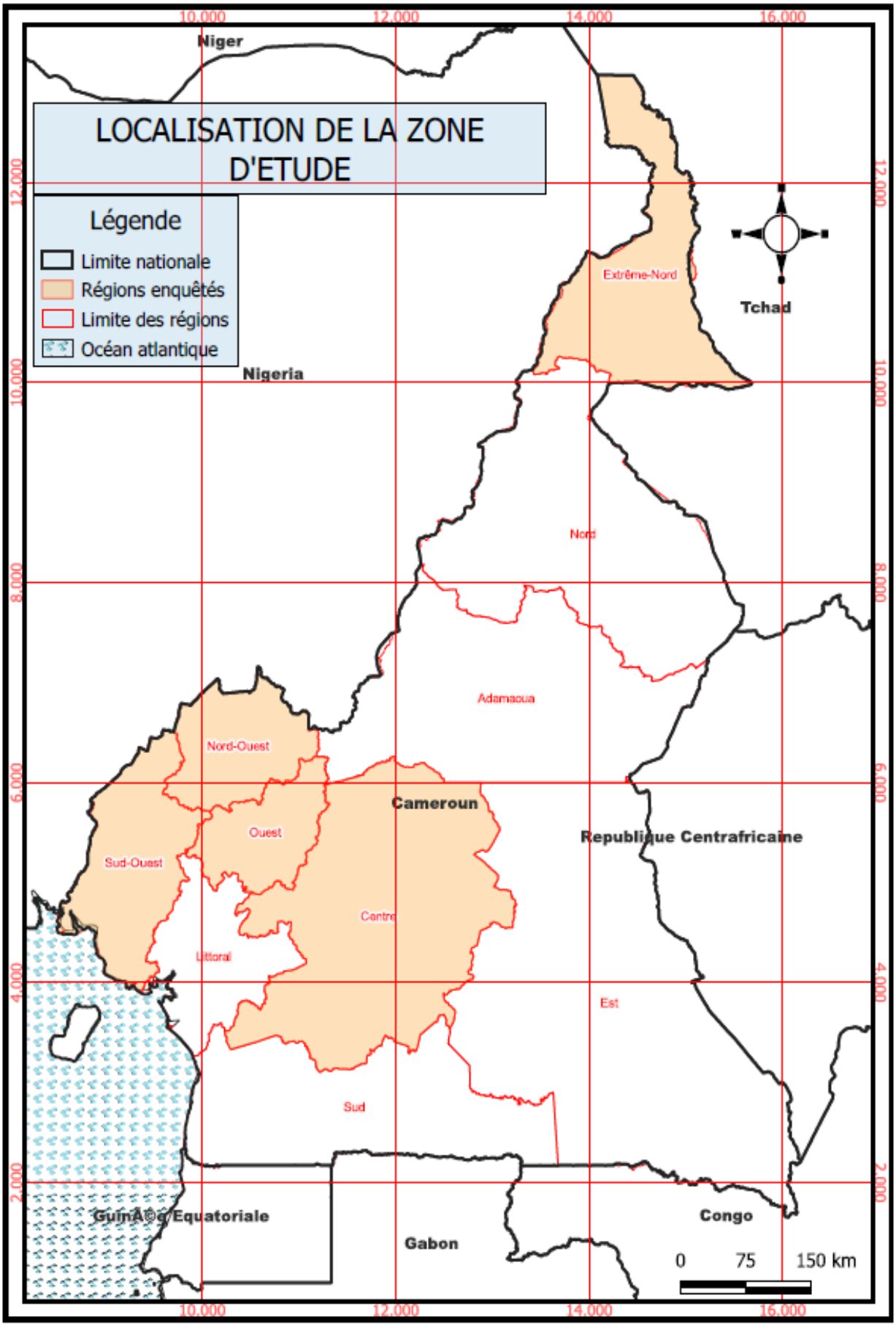
- PM
- MINESEC/SEESEC
- MINESEC/SG
- IGE
- DSGE
- RDSE/DDSE
- Education Secretaries
- School Heads
- Files/ Archives

APPENDIX: V1


LOCALISATION DE LA ZONE D'ETUDE
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Régions enquêtés
Limite des régions
Océan atlantique
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Tchad
Cameroun
Republique Centrafricaine
Guinée Equatoriale
Gabon
Congo
Extrême-Nord
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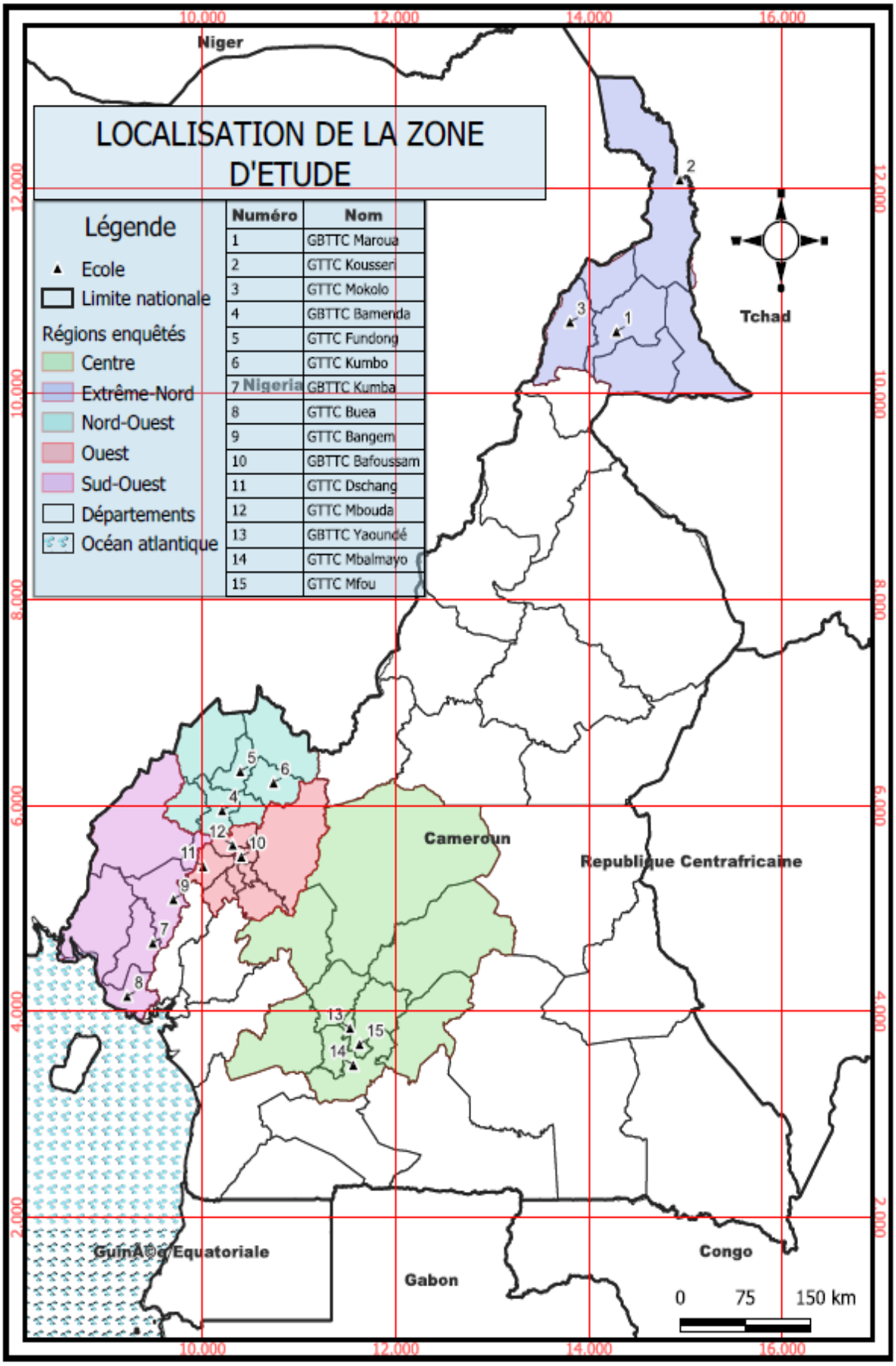
APPENDIX: V1I



APPENDIX VIII

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
****
UNIVERSITE DE YAOUNDE I
****
FACULTE DES SCIENCES DE L'EDUCATION
****
DEPARTEMENT DE CURRICULA ET EVALUATION

Option : CURRICULA ET EVALUATION

N° 155/20 UY1/FSE/VDSSE/

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
****
UNIVERSITY OF YAOUNDE I
****
FACULTY OF EDUCATION
****
DEPARTEMENT OF CURRILUM AND EVALUATION

Option: CURRICULUM AND EVALUATION

RESEARCH AUTHORISATION

I the undersigned, **Professor MOUPOU Moïse**, Dean of the Faculty of Education, University of Yaoundé I, hereby certify that **AMOMBI DELPHINE AMANA,** matriculation N° **18W6614,** is a PhD research student in the Faculty of Education, Department: **Curriculum and Evaluation**, option: **Educational Management**

He is carrying out a research work in view of obtaining a PhD, precisely in the field of **Educational planning**. His work titled: **"The Evaluation of ICT policy and development of ICT model for Teacher Training Colleges in Cameroon"**, is under the supervision of Professor Professor Mbaha Joseph of the University of Doula and Professor PATRICK KONGNYUY of the University of Bamenda.

I would be grateful if you provide her with every information that can be helpful in the realization of his research work.

This Authorisation is to serve the concerned for whatever purpose it is intended to.

Done in Yaoundé on 12 AOUT 2020

For the Dean, by order

Le Vice-Doyen
DONGO Etienne
Professeur

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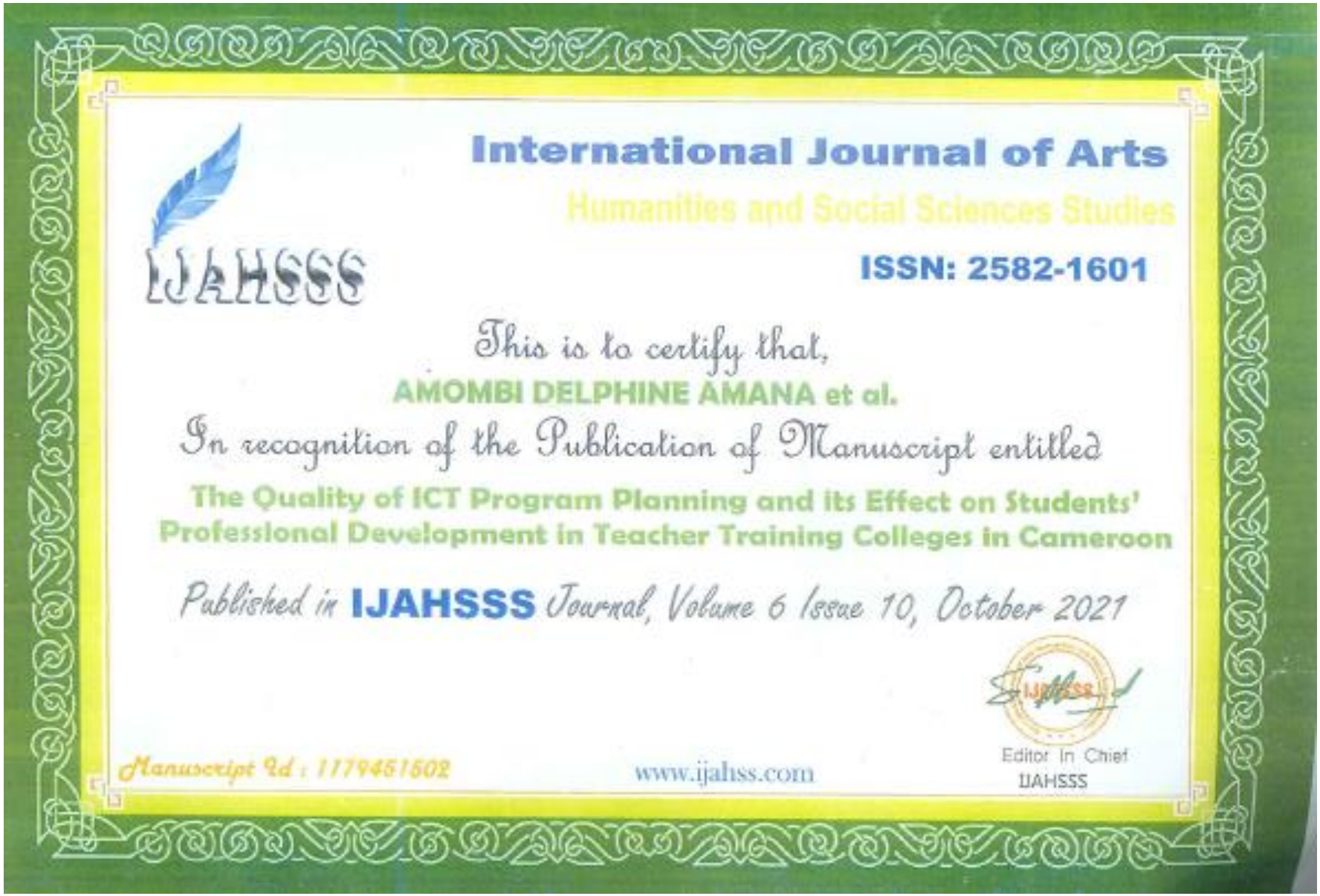

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This is to certify that,

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