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UNIVERSITÉ DE YAOUNDÉ I

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**ICT INTEGRATION IN HIGHER EDUCATION AND
THE PROFESSIONALISATION OF UNIVERSITY
STUDIES: CASE STUDY, THE GEOGRAPHY
DEPARTMENT, UNIVERSITY OF YAOUNDE I.**

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DECLARATION

I hereby declare that this piece of work, entitled “**ICT integration in higher education and the professionalisation of university studies**”, is my original piece of work. This dissertation has never been submitted to any university or higher institute of learning and training for an academic award of any kind. Additionally, all sources and quotations used in this work are fully acknowledged by the researcher in the references section (page 115).

Academic year 2024 - 2025

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CERTIFICATION

The present note is to certify that the work entitled “**ICT integration in higher education and the professionalisation of university studies**” was conducted by Miss. MARIE NOEL NAHLELA under my humble supervision and guidance.

May 2025

Signed.....

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DEDICATION

**This piece of work is dedicated to my grandmother, grandfather, my sister
and daughter.**

Nah, Lydia, Ngu Elias, Shiela Api and Beyond-Ketsiah Api

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LISTS OF ABBREVIATIONS AND ACRONYM

SPSS:	Statistical Package for Social Sciences
ICT:	Information and Communication Technology
BMD:	Bachelor-Masters-Doctorate
IBM:	International Business Machines
UNESCO:	United Nations Educational, Scientific and Cultural Organisation
COVID-19:	Coronavirus disease of 2019
NICI :	National Information and Communication Infrastructure
UNEVOC:	United Nations Educational, Scientific and Cultural Organisation and vocational education
MRC:	Multimedia Resources Centres
ADB:	Asian Development Bank
ANT:	Actor-Network Theory
TAM:	Technology Acceptance Model
FSE:	Faculty of Education Sciences
UNDP:	United Nations Development Program
LMD:	License-Master-Doctorate

ABSTRACT

The issue of professionalisation of education has become a major concern at all levels of Education. The introduction of Information and Communication Technologies (ICT) in education is seen as a major step towards professionalisation of university studies though it does not go without challenges. The present study seeks to investigate the effects of Information And Communication Technologies (ICT) integration in higher education on the professionalisation of university studies, with evidence from the University of Yaoundé I, Cameroon. To achieve this, the study adopts a quantitative research approach based on the descriptive survey design. A closed-ended questionnaire constructed based on the Likert scale was used to collect data from the field. A sample size of 276 participants was purposefully selected for the study with the help of the Supervisor. Validity of the instrument was ensured through the face and content validity, while the reliability of the instrument was tested through a pilot study and analysed using the Alpha Cronbach. Three major theories were convoked to explain the studied phenomenon; the actor-network theory, the social capital theory and the technology acceptance model. The data collected was analysed using the statistical data analysis techniques, precisely descriptive statistics (frequency and percentage) and inferential statistics (Simple linear regression analysis). The statistical package for social science (SPSS, 27) was used as a data analysis tool. The following results were obtained: In hypothesis one, the findings revealed that Information And Communication Technologies (ICT) infrastructural dispositions exert a positive and influence on the professionalisation of university studies. In hypothesis two, it was found that the provision of digital resources is a positive and strong predictor of the professionalisation of university studies. In the third hypothesis, the findings revealed that the availability of trained lecturers has a statistically significant influence on the professionalisation of university studies, and in the fourth hypothesis, it was found that Information And Communication Technologies (ICT) access exerts a positive influence on the professionalisation of university studies in the University of Yaoundé I, Cameroon. Based on the above results, it is suggested that, policy makers and University authorities should upgrade the state of digital infrastructure, provide digital resources like smart boards and white boards, offer in-service training to lecturers on digital literacy through workshops and seminars and bridge the digital divide by widening access to technology through free wireless networks, quality internet connectivity, constant electrification of the university campuses, etc

Key words: Information and Communication Technology (ICT) integration; Professionalisation; Higher Education, University; Digitalisation

RESUME

La question de la professionnalisation de l'éducation est devenue une préoccupation majeure à tous les niveaux de l'éducation. L'introduction des TIC dans l'éducation est considérée comme une étape majeure vers la professionnalisation des études universitaires, même si elle n'est pas sans défis. La présente étude vise à examiner les effets de l'intégration des TIC dans l'enseignement supérieur sur la professionnalisation des études universitaires, en s'appuyant sur des données de l'Université de Yaoundé I, au Cameroun. Pour ce faire, l'étude adopte une approche de recherche quantitative basée sur un plan d'enquête descriptif. Un questionnaire fermé construit sur la base de l'échelle de Likert a été utilisé pour collecter des données sur le terrain. Un échantillon de 276 participants a été délibérément sélectionné pour l'étude avec l'aide du superviseur. La validité de l'instrument a été assurée par la validité apparente et la validité de contenu, tandis que la fiabilité de l'instrument a été testée dans le cadre d'une étude pilote et analysée à l'aide de l'algorithme Alpha Cronbach. Trois théories majeures ont été invoquées pour expliquer le phénomène étudié : la théorie de l'acteur-réseau, la théorie du capital social et le modèle d'acceptation des technologies. Français Les données collectées ont été analysées à l'aide de techniques d'analyse de données statistiques, de statistiques descriptives précises (fréquence et pourcentage) et de statistiques inférentielles (analyse de régression linéaire simple). Le progiciel statistique pour les sciences sociales (SPSS, 27) a été utilisé comme outil d'analyse de données. Les résultats suivants ont été obtenus : Dans l'hypothèse 1, les résultats ont révélé que les dispositions infrastructurelles des TIC exercent une influence positive sur la professionnalisation des études universitaires. Dans l'hypothèse 2, il a été constaté que la mise à disposition de ressources numériques est un prédicteur positif et fort de la professionnalisation des études universitaires. Dans la troisième hypothèse, les résultats ont révélé que la disponibilité d'enseignants formés a une influence statistiquement significative sur la professionnalisation des études universitaires, et dans la quatrième hypothèse, il a été constaté que l'accès aux TIC exerce une influence positive sur la professionnalisation des études universitaires à l'Université de Yaoundé I, au Cameroun. Sur la base des résultats ci-dessus, il est suggéré que les décideurs politiques et les autorités universitaires améliorent l'état de l'infrastructure numérique, fournissent des ressources numériques telles que des tableaux intelligents et des tableaux blancs, offrent une formation continue aux enseignants sur la littératie numérique par le biais d'ateliers et de séminaires et comblent la fracture numérique en élargissant l'accès à la technologie grâce à des réseaux sans fil gratuits, une connectivité Internet de qualité, une électrification constante des campus universitaires, etc.

Mots clés : Intégration des technologies de l'information et de la communication (TIC) ; Professionnalisation ; Enseignement supérieur, Université ; Numérisatio

CHAPTER 1

INTRODUCTION

Technology has become one of the most distinctive elements of the 21st century, defined by the information and industrial revolutions (Alshuaibi, 2023). Many countries consequently have had to reevaluate their policies to keep up with the rapid pace of technological development, and the components of modern society have been transformed into digital knowledge, cultural transparency, smart institutions, and virtual environments because of new technologies (McGuinness, Pouliakas and Redmond, 2021), cited by (Alshuaibi, 2023). Educators and policymakers worldwide recognise these modern technologies as a crucial opportunity to drive significant improvements in educational systems' inputs, processes, and outputs. Technological advancement is now the measure by which the performance of any area is measured, and the success of the educational process is predicated on the efficient use of advanced technology in teaching.

In Cameroon, the integration of Information and Communication Technologies (ICT) into university studies has been driven by various policy papers aiming at enhancing educational outcomes and aligning them with global standards. The 1993 University Reforms, the Bologna Process (1995), the 2001 Orientation Law on Higher Education, the 2007 Bachelor-Master-Doctorate (BMD) reforms, and the 2008 New University Governance Program, among others, have restructured governance and professionalisation in the country's Higher Education system. But then, reforms, developments, and modernisation, particularly in teaching and learning, are only possible when adequate technology is waiting to be endorsed (Saif, et al. 2022).

The present study seeks to investigate the effects of Information and Communication Technologies (ICT) integration in higher education on the professionalisation of university studies, with evidence from the University of Yaoundé I, Cameroon. This study is structured under the various topics. Chapter 1: Introduction which consist of Background of the study. The Background of the study is segmented under the subtopics, Historical Background, Conceptual Background, Theoretical Background, and the Contextual Background. The second sub heading is the problem of Study, the third is the Objectives of the study, the fourth is the research questions, fifth, the Research hypothesis, sixth, the Implication of the study, seventh the delimitation of the study and eight Definition of key themes.

Chapter 2 consists of a review of related literature, the Theoretical review, Review of related Studies and Gap. Chapter Three consists of the methodological framework of the study, the Research design, the research method, the Sources of data, Population of the study, and Population of the study. In this research, Higher Education and university are used interchangeably, even if the university is just a part of the HE system. Regardless of this awareness that Information and Communication Technologies (ICT) are a sustainable solution to graduate Professionalism worries, University graduates are still caught in the traps of low low-quality labour force, e-skills deficiency, underemployment, low-quality jobs, and under professionalism.

The present study seeks to investigate the effects of Information and Communication Technologies (ICT) integration in higher education on the professionalisation of university studies, with evidence from the University of Yaoundé I, Cameroon. Hence, this research will make use of references to Western policies as international trends 'impact on local education policies, and experience sharing among countries in the education domain has almost become a norm Eta (2019).

Background of the Study

The backgrounds of this study provide the backbone for Information and Communication Technologies (ICT) integration and the state universities and professionalisation of university studies. It is divided into the historical, the conceptual, the theoretical and the contextual backgrounds of the study. This is further explored below.

Historical background

The history of Information and Communication Technologies (ICT) preexists the invention of the modern digital computer by many centuries. It can be traced back many centuries ago with the invention of machines for calculating fixed numerical tasks, such as the abacus. Blaise Pascal invented the first commercial calculator in January 1604 which is a hand powered adding machine. Wilhelm Schickard built the first mechanical calculator in 1623. Charles Babbage designed a different engine in Victorian times in 1822, and around 1890 the IBM Corporation sold punch-card machines (Reetesh 2014).

Computers were introduced in schools and became of importance to governments in the early 1980, when cheap microcomputers were made available for the consumer market. Many high income countries started to build their own brand of microcomputers and distributed these to

schools for fear of losing the technology race. As it became obvious that computers could be used for more than just mathematical calculations, the field of computer science broadened to study computation in general.

Computer science began to be established as a distinct academic discipline in the 1960s, with the creation of the first computer science departments and degree programs. Since practical computers became available, many applications of computing have become distinct areas of study (Dhami, 2011), cited by Reetesh (2014). Thereafter, Technology was introduced into education as a new school subject, enabling students to learn about it. The aim of the early introduction of microcomputers in education was due to the high expectations that it would make education more effective and motivating. However, this objective was not attained as the computers were used only as a supplement to the existing curriculum and much less as tools that were fully integrated into the learning of traditional subject matter. Hence a decrease in the investments in hardware, staff development and research programs on Information and Communication Technologies (ICT) between 1992 and 1995.

It was only years later, after the World Wide Web (WWW) was created, that Information and Communication Technologies (ICT) were boosted for a second time. This time, it was commonly accepted that education systems are the ideal place to prepare citizens for lifelong learning in an information society. Hence, this demanded education to focus on creating opportunities for students to acquire new skills related to autonomous learning, communication skills, authentic problem solving, collaborating in teams via various synchronous and asynchronous communication technologies, etc. Hence, Information and Communication Technologies (ICT) was introduced in education at all level of the system because it has been conceptualized as a facilitator for major education reforms reasons for involving changes at the system level (national or regional), the school level, as well as the classroom level since the 1990s by high income countries (Pelgrum & al. 2003).

Meanwhile, the technology revolution lead to digital education and cultivated school authority in the utilisation of digital technology (Ribeiro et al 2016). The role of Information and Communication Technologies (ICT) in the 21st century being that of effective transaction and

communication of knowledge or information to its seekers. Information and Communication Technologies (ICT) has organized information, consequently accelerating the pace of learning, innovation and knowledge creation and dissemination. Therefore, Information and Communication Technologies (ICT) has created a learning revolution that has given rise to lifelong learning.

Information and Communication Technologies (ICT) in education refers to Learning through Information and Communication Technologies (ICT)', which refers to the integration of Information And Communication Technologies (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. Information and Communication Technologies Information and Communication Technologies (ICT)) has been identified as one of the crucial factors that affect teaching effectiveness and student learning worldwide reason why UNESCO and many international organisations, and governments emphasized the importance of Information and Communication Technologies (ICT) and put in resources to incorporate Information and Communication Technologies (ICT) into education systems. Chen et al. (2015).

Over the past decades, globalisation and technological change have created and accelerated a new global economy powered by technology, fueled by information and driven by knowledge. The rise of this new global economy has serious implications for the nature and purpose of education. With the exponential continuous growth of access to information, schools have moved from being a mere venue for the transmission of a prescribed set of information from teacher to student to promoting learning to learn Tinio, (2002).

For developing countries Information and Communication Technologies (ICT) have the potential for increasing access and improving the relevance and quality of education. It thus represents a potentially equalizing strategy. Information and Communication Technologies (ICT) greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor (Jully 2011).

Information and Communication Technologies (ICT)s were officially introduced into Cameroon educational system by the government in 2001 with the launch of a Cyber Education targeting the secondary and tertiary sector of education. This was followed by the establishment of major

projects such as the establishment of multimedia resources centers (MRCs) in universities, professional and technological schools, and some government secondary schools; training monitors to manage MRCs; creating learning platforms; interconnecting the six state universities, and establishing training units in professional schools and universities (Tetang 2007).

Theoretical background

Information and Communication Technologies (ICT) are widely recognised as critical enablers of socio-economic development and education reform Bitegeko, Lawrent, and Cosmas, 92024). In higher education, digital transformation introduces new pedagogical resources and organisational practices that can address long-standing challenges in teaching, learning and the professionalisation of study programmes. Because modern societies are increasingly knowledge-based, developing countries must equip students with ICT competencies so graduates can solve problems, innovate, and contribute to knowledge creation. For these reasons, digitalisation of education is closely linked to improving inclusive, quality education in digitally mediated learning environments UNESCO, (2011).

ICT supports the professionalisation of university study in two complementary ways. First, it enhances pedagogical processes by enabling more interactive, learner-centred practices (blended learning, online labs, digital assessments). Second, it builds students' technical and transferable skills (e.g., GIS, data analysis, digital collaboration) that are directly applicable to workplace demands. Teachers play a central role in this transformation: by integrating ICT into instruction, they can develop students' problem-solving, creativity and collaboration skills — attributes valued in the labour market (Tejedor et al., 2020).

UNESCO's ICT in Education framework (2011) provides a useful conceptual lens for this study. The framework proposes three progressive approaches that guide ICT integration in curricula: Technology Literacy, enabling learners to use ICT tools efficiently to support basic learning tasks. Knowledge Deepening: allowing learners to use ICT to acquire and apply in-depth disciplinary knowledge to complex, real-world problems. Knowledge Creation: empowering learners to generate new knowledge, produce original work and engage in collaborative innovation (UNESCO, 2011).

These stages emphasise that ICT integration is not only about access to devices but also about pedagogical design, curriculum alignment, and capacity building for both teachers and learners.

Applying this framework to the Geography Department clarifies how ICT can contribute to both disciplinary depth (e.g., GIS and remote sensing skills) and broader professional competencies.

Recent studies show that complementary teaching models — a mix of asynchronous lectures and synchronous seminars — effectively develop digital literacy in higher education contexts Tejedor et al. (2020). Such blended approaches combine flexible access to digital resources with real-time interaction, supporting professional engagement, formative assessment, and learner empowerment. For departments like Geography, these models can integrate technical training (GIS labs, field data apps) with collaborative problem-solving and assessment that reflect workplace practices.

Beyond classroom practices, the broader policy environment matters. Policy literacy, the ability of institutions, teachers and students to understand and apply educational and ICT policies, underpins scalable and sustainable digital practices. Clear policies and institutional support create stable conditions for online learning and cross-border education Wei, (2022). Policies that address infrastructure, teacher training, digital content standards and data governance are essential to move from ad hoc ICT use to systematic professionalisation.

Although the potential of ICT is clear, empirical studies report persistent barriers in African universities, including Cameroon. Common obstacles include: Unreliable or slow Internet connectivity, which limits access to online resources and cloud-based tools (Oluwayemi et al., 2020). Low levels of digital literacy among students and sometimes lecturers, which constrain meaningful ICT use Oluwayemi et al. (2020). Inadequate institutional planning and spatial documentation (e.g., lack of campus maps showing ICT facilities), which impedes efficient resource allocation and student access a problem directly relevant to your case study. These constraints mean that, despite policy rhetoric, many universities struggle to achieve the UNESCO (2011) goals.

Theoretical and policy frameworks (UNESCO, blended learning literature, and recent empirical studies) must be addressed for ICT to fulfil its potential in professionalising university studies. This research contributes by linking spatial factors (e.g., absence of a campus map) to pedagogical and technical aspects of ICT integration in a focused departmental case study.

Contextual Background

Cameroon is a lower-middle-income country with a population of over 27.9 million (2022) (World Bank, World Bank Group, 2024), located at the heart of Central Africa, and at the crossroads of Equatorial Africa to the South and Tropical Africa to the North. Cameroon's 475, 442 square kilometres is triangular in shape, with a coastline bordered to the West by the Gulf of Guinea, with access to the Atlantic Ocean. Cameroon's land boundaries are Nigeria to the West, the plains of the Lake Chad basin to the North, the Republic of Chad and the Central African Republic to the East and Equatorial Guinea, Gabon and Congo Brazzaville to the South. The terrain is characterised by Plateaus and mountain chains.

Cameroon has had colonial and contemporary socio-political and linguistic experiences, especially her bilingualism in English and French, with ten administrative regions, two of which are English-speaking (29%) and eight of which are French-speaking (71%). Cameroon has a population of 19 million. This is made up of about 279 ethnic groups with an annual growth rate of 2.0%, with 40.6% within the age range of 0-14 years. Cameroon, a decentralised unitary state, according to its constitution of January 1996, has one of the best-endowed primary commodity economies in Sub-Saharan Africa – owing to its oil resources and favourable agricultural conditions. The main exports are cocoa, coffee, rubber, 38 cotton, bananas, petrol, timber and aluminium (UNSTATS, 2010). It is the leading country in the Central African region, and recently made it to the Network Readiness Index scale, ranking 128th out of 133 nations worldwide. Because its poverty reduction rate is lagging behind its population growth rate, the overall number of poor in Cameroon increased by 12% to 8.1 million between 2007 and 2014, and poverty is concentrated in the country's northern regions, where 56% of the poor live World Bank, World Bank Group, (S2024).

The National Institute of Statistics UNSTATS, (2010), post 2007 census figures showed that, less-than 15 age group represents 43.6% of total population, while half of the population is less than 18. The impact of an active population such as this on the educational system cannot be overstressed. The population of school attendees keep on increasing. The National Institute of Statistics further showed that in the school year 2008-2009 the demand for primary school population stood at 3,350,662, and that for secondary education was 1,013,667. Whereas in the higher education sub-sector there were 182,353 students in all for that school year; but this number

almost doubled in 2014 to a staggering 357,504 students (Ministry of Higher Education, (2014, p. 23) Arrey-Ndip, Tene , Nouazi , Njikam, & Tamajong, (2020).

Education in Cameroon

Education in Cameroon operates under four ministries, namely:

The Ministry of Basic Education (MINEDUB) - in charge of nursery, primary education and teacher training colleges;

The Ministry of Secondary Education (MINESEC) - in charge of general and technical secondary education and technical teachers' training colleges;

The Ministry of Employment and Vocational Training (MINEFOP) - in charge of post-primary education and vocational training;

The Ministry of Higher Education (MINESUP) takes charge of post-secondary and higher education National Institute of Statistics, 2010, p. 12).

The Ministry of Higher Education manages all eleven public universities and is a supervisory body to hundreds of other private higher education institutions in the country. The Minister of Higher Education is the chancellor of all Cameroon's state universities. The eleven public universities under the ministry include: sThe University of Bamenda; University of Buea; University of Dschang; University of Douala; University of Maroua; University of Ngaoundere; University of Yaounde 1 (first university in Cameroon - founded in 1962); University of Yaoundé II-Soa (carved out of University of Yaoundé), the University of Bertoua, the University of Ebolowa and the University of Garoua. Like in most universities all over the world, these universities run specialised institutions in various academic and professional domains (Commonwealth Education Online, n.d).

The University of Yaoundé I is the leading state University in Cameroon, a higher education establishment located in Yaoundé, Cameroon and was established after the split of University of Yaoundé into two entities in 1993 and has ever since grown to enroll over 10000 undergraduates, graduate, and doctoral students. It comprises of 7 faculties which include Faculty of Arts, Humanities, and Social Sciences, Sciences, Medicine and Biomedical Sciences, Teacher's Training College, National Advanced School of Engineering, Higher Teacher's Training Technical School and Science of Education.

From the 1993 Higher Education Reform to the Education and Training Sector Strategy Paper (DSSEF) validated in 2013 and in accordance with the orientation law of higher education of 2001, higher education retains its fundamental missions of production, organisation and dissemination of scientific, cultural, professional and ethical knowledge for the development of the nation and the progress of mankind. The government of the Republic enable the operationalisation of the Faculty of Education Sciences (FSE), for the start of the 2013 academic year /2014. The administration of the Faculty of Science of Education comprises: 3 vice deans, a head of division in charge of administration and finances, heads of service and heads of department.

Research has proven that, technology has the potential to renovate the ways of instruction, where and how learning occurs and the roles of students and educators in the instructional process. Information and Communication Technologies (ICT) acts as the foundation stone of the contemporary world, forming the new worldwide economy to deliver fast changes in the society. Within the previous decade, Information and Communication Technologies (ICT) has advanced and changed at such a speed, that developing countries have not been able to catch up with the revolution and have been left behind and thus lag in their communication with the developed countries (UNESCO, 2002).

In Cameroon, despite the persistence of the digital divide, the Information and Communication Technologies (ICT) sector has evolved noticeably since 2010. One of the major development was on the occasion of the end of the year 2015 and the New Year 2016 with the speech of the Head of State to the Nation which says:

I instructed the Government to accelerate the establishment of the preconditions for the industrialisations of our country. These essential conditions are the development of communication and telecommunications infrastructure. In this last area, we must catch up as quickly as possible with our delay in the development of the Digital Economy. This is a real growth accelerator, in addition to being a real niche of new jobs for our youth. We must be able to take full advantage of it. The Government, in its organisation, will give this sector all the attention it deserves. (National ICT Strategic Plan 2020, 2016)

As a result, Cameroon has registered increased investments in telecommunication and Information and Communication Technologies (ICT) infrastructure, including the extension of the national optical fiber backbone to about 12,000 km, connecting 209 of the country's 360 sub-divisions, and

neighboring countries such as Chad, Gabon, Equatorial Guinea, the Central African Republic and Nigeria (<https://www.businessincameroon.com/>).

The availability of this infrastructure, which allows access to broadband internet, coupled with the high mobile penetration (over 80%), has boosted the use of smartphones. According to the National Telecommunications Observatory of the Telecommunications Regulatory Agency, the penetration rate of these phones has increased from 25% in 2016 to nearly 40% in 2020, a 15% increase over 4 years. CIPESA (2019). Thus, the government has developed the infrastructure, making it possible for more people to have smartphones and computers.

As far as education is concerned, in an effort to develop Information and Communication Technologies (ICT) in education, President Biya promised the introduction of computing in schools and the donation of computer rooms to schools Mbangwana, (2009). This promise was accomplished via public and private initiatives, such as the creation of an official computer curriculum outline for secondary schools and the donation of some computer labs by two government National Agency for Information and Communication Technologies (2008) and private bodies, MTN Foundation (2005), Nangue (2011). Some Information and Communication Technologies (ICT)-related policies and strategies were adopted, and legal frameworks were put in place to ensure a step into the Information Society era. The most prominent of these was the Cameroon National Information and Communication Infrastructure (NICI) policy and plan drafted in 2004. The first Information and Communication Technologies (ICT) policy and strategic document was developed in 2007, led by the MINEDUB inspectorate in charge of education. It is only until 2022, 14 years after that, a revised Information and Communication Technologies (ICT) Policy and Strategic Implementation Framework was built. Ministry of Basic Education (2022). This Policy document concerns only Basic Education.

Concerning Higher Education in Cameroon, we have: the 1993 University Reforms, the Bologna process 1995, the 2001 Orientation Law on Higher Education, the 2007 Bachelor-Masters-Doctorate (BMD) Higher Education reforms, and the 2008 New University Governance Program amongst other things have restructured governance and professionalisation in the country's Higher Education system Marshall J.,(2011). Other policy reforms that restructure Information and Communication Technologies (ICT) in the University includes National Policy for the Development of Information and Communication Technologies 2007.

But looking at the above legal frameworks, there is no main developed framework for the integration of Information and Communication Technologies (ICT) in education, especially in higher education. Thus, skills and knowledge in Information and Communication Technologies (ICT) are not developed in higher institutions. Whereas Information and Communication Technologies (ICT) act as the foundation stone of the contemporary world, thus, understanding and putting into practice this technology and its fundamental concepts is considered part of the core of education. It is an effective and influential instrument for providing educational opportunities UNESCO (2002). Therefore, the slow development of Information and Communication Technologies (ICT) policies and goals in Africa and Cameroon in particular is a setback in education, as it accounts for the impracticality and unprofessionalism of graduates. E skills are limited to a few social platforms, such as Facebook, TikTok tock and sending and receiving emails via Yahoo Mail and Gmail most of the time.

Statement of the Problem

The role of Information and Communication Technologies (ICT) in fostering development has become more generally recognised, as computers and the internet have continued to transform the economy and society. Therefore, the Okinawa Charter on the Global Information Society, adopted by leaders of the informal forum for discussing and coordinating global economic and political issues, countries (G8 countries) at their summit meeting in August 2000, highlighted the importance of Information and Communication Technologies (ICT) in the global development agenda.

The G8 called for concerted action to disperse the benefits of the digital revolution to the entire global community and established a multi-stakeholder partnership, the Digital Opportunities Task Force (G8 DOT Force), to develop new, innovative strategies for using Information and Communication Technologies (ICTs) to spur social, economic and civic development. They focused on the contribution Information and Communication Technologies (ICT) can make to meeting basic development needs and creating digital opportunities that are not limited to identifying development challenges but addressing those challenges in the 21st century. Access empowers people and communities, laying the foundations for equality, sustainability, and prosperity. It provides a clear illustration of the rights-based, holistic approach to development United Nations General Assembly, (2015).

Knowing that computer technology is an important source of innovation and improvement of efficiency for many sectors across the globe, African countries in the effort to promote equitable and affordable access to Information and Communication Technologies (ICT), the Rwandan minister of Information and Communication Technologies (ICT) and Innovation, Paula Ingabire, during the 2022 E-learning African Annual Conference and Exhibition in Kigali remarks that:

We have seen tremendous collaboration during the pandemic to enable greater access to digital services. Moving forward, we need even greater mobilisation of all levels of the government and private sector organisations to develop impactful solutions that will ensure equitable and affordable access to broadband connectivity, to achieve the targets set for 2025.

Thus, a number of master plans on Information and Communication Technologies (ICT) in education have been produced in this regard in Cameroon. These plans reveal that educational innovations in Information and Communication Technologies (ICT) have been increasingly embedded within a broader framework of education reforms that aim to develop students' capacities for self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn. Regardless of the emergence of resources, funding, framework and reforms such as the United Nations (2024). Goal 4: Quality Education 4.4, which has as a goal,

to substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship in materialising the Information and Communication Technologies (ICT) in education, evaluation of implemented policy and programs in schools is unavoidable.

The Cameroon government, in an effort to achieve the Sustainable Development Goal, amongst other projects, has improved its efforts on various plans. Cameroon's digital landscape was boosted by the launch of the National ICT Strategic Plan 2020 (2016), which acknowledged the digital economy as a driver for development. Article 4 of the Cameroon E-Communications law (2010) states that every citizen has the right to benefit from electronic communications services. The same law establishes a Universal Service Access Fund, aimed at ensuring equal, quality and affordable access to services (Articles 27-29). Whereas internet and mobile telephony have registered growth, access and affordability remain a challenge, especially among rural and poor communities.

While some Information and Communication Technologies (ICT) frameworks have been proposed, they lack important aspects that can improve the relationship between Information and Communication Technologies (ICT)) and professionalisation Harindranath and Sein, (2007). According to the World Youth Report United Nations, (2020), many developing nations are far behind in their e- activities and e- learning Chen, Castillo, & Ligon, (2015). Cameroon lacks related frameworks for the adoption of Information And Communication Technologies (ICT)s Ministry of Basic Education, (2022), and sound models and frameworks are needed to assist the implementation of any Information and Communication Technologies (ICT)-enabled technologies within the higher education sector to access and equity: for the professionalism in University studies.

The younger generations are very much impacted in Cameroon as the country moves at a slow pace as a result of limitations in Information and Communication Technologies (ICT) access and equity. Even though The Global Declaration of Higher Education made at UNESCO's 1998 world meeting in Paris states that the higher education institute should be of the first institutes that would benefit from potential allowances and facilities of information and communication technology (Moslehpour, Sadeghi, Hill, & Abu-aisheh, 2006) because higher education plays an important role in the development of most nations, (Foche, George, & Mohamadou, 2016) resources are rather allocated more on the primary and the secondary sectors.

Access provided by the Cameroon government as one of the major investments on Information and Communication Technologies (ICT) is just one aspect out of many because countries such as South Africa, Brazil, Colombia, Turkey, Costa Rica, Mexico, and Romania, which exhibit higher income per capita, have less than 60 per cent of their population online. This indicates that access to the internet is not enough, in itself, to improve the lives of people. It would be a mistake to assume in a world increasingly driven by interconnectedness, immediacy of information, and ubiquitous communications that everyone can get online, just as there is no guarantee that broad access to so much information will ensure that it is used in ways that lead to more desirable social goals. (IFLA, 2017).

According to a study by Poushter, Bishop, and Chwe , (2018) People in less-developed countries are using social networking sites more actively than people in more-developed countries (71

percent compared to 67 percent). Sending emails seems to be more prevalent among countries in more-developed regions (81 percent compared to 53 percent) or discussion sites and to read or download news or books, compared with 75 percent in more developed countries. It follows that, twenty-seven percent of those in less-developed countries look for health information online. Interestingly, this is very close to matching the 30 percent of people who do so in more-developed countries.

The reason for the above mentioned gap could be as a result of limited resources and deficient knowledge and skills. Users who don't participate in forums or seek out news online may focus those activities on social networking sites. IFLA, (2017) Information and Communication Technologies (ICT) policies in higher education have not been elaborated in a way to promote the acquisition of e- skill and knowledge that would intern boost employability.

According to (Charlotte, 2016)“One of such a barrier which is a very important aspect of technology integration into education and common with most Sub-Saharan African countries like Comoros, Congo, Guinea, Lesotho, and Madagascar and Cameroon in particular, is the absence of a clear vision and planned strategy for Information and Communication Technologies (ICT) integration in Education Wallet and Beatriz (2015). Other factors influencing professionalism amongst student include the lack of technological resources; the lack of Knowledge and skills as well as the attitudes and beliefs of teachers and parents, etc.

The barrier to an objective use and access to Information and Communication Technologies (ICT)s and e skills towards professional development is due to a lack of a clear vision and an Information and Communication Technologies (ICT) policy guiding the use and teaching of Information And Communication Technologies (ICT)s in Cameroon. (Charlotte, 2016). Tetang, T.J. (2007); Nangue (2010) & Fouda et al. (2013) all demonstrate that there is a lack of a clear vision and an Information and Communication Technologies (ICT) policy guiding the use and teaching of Information And Communication Technologies (ICT)s in Cameroon education. Thomas, B. cited in Hew, K. F. &Thomas, B. (2007), stated that the lack of School Information and Communication Technologies (ICT) policies, the non-existence of an Information and Communication Technologies (ICT) integration plan, the reliance on sponsors and donors which is not always guaranteed also affects effective Information and Communication Technologies (ICT) integration in the classroom.

University students suffer Information and Communication Technologies (ICT)s skills deficiency which results in limited access to knowledge and unprofessionalisation. The integration of Information And Communication Technologies (ICT) in education is deficient as noted by (Pius W. Akumbu, Patience Teneng, Sylvanus Ngu, 2022) “In the age of unparalleled digital evolution in education, it was only in 2001 that Information And Communication Technologies (ICT) was officially launched into the school curriculum in Cameroon by the president of the republic. This saw the arrival of the cyber education project, which targeted the secondary and higher education sectors (Josué, 2007). Since then, multimedia resource centres have gradually opened in almost all state universities. Despite this, few computer technicians have been trained, while insufficient online learning platforms have been created in schools at all levels (Bass, 2012)

However, this lukewarm culture toward the pedagogic integration of Information And Communication Technologies (ICT)s is as a result of reasons including the absence of a vibrant educational technology policy (Pius W. Akumbu, Patience Teneng, Sylvanus Ngu, 2022), whereas, western economies especially the United States and Europe and lately Asia have developed exponentially over the years enabled by Information And Communication Technologies (ICT) infrastructure and technologies. As rightly noted by Tony Blair in the preceding paragraphs (although referring to the situation in the United Kingdom), likewise, Cameroon cannot afford to train its youth in yesterday’s skills and expect them to be effective in tomorrow’s world Arrey-Ndip, Tene , Nouazi, Njikam, and Tamajong, (2020).’

Research objective of the study

The research objectives of the study are divided into two. Being the main and specific research objectives.

Main Research Objective

This study seeks to evaluate the extent to which Information and Communication Technologies (ICT) integration in higher education influences the professionalisation of University Studies in the University of Yaoundé 1 in Cameroon.

Research questions of the study

This refers to the main interrogation which the researcher wants to address. It is divided into two; that is; the main and the specific research questions.

Specific Research Objectives

To examine the extent to which Information and Communication Technologies (ICT) infrastructural dispositions influences the professionalisation of university studies in the University of Yaoundé I.

To explore how availability of trained personnel influences the professionalisation of University studies in the University of Yaoundé I.

To evaluate Information and Communication Technologies (ICT) access in higher education that influences the Professionalisation of University studies at the University of Yaoundé I.

Main research question

To what extent does Information and Communication Technologies (ICT) integration in higher education influence the professionalisation of university studies in the University of Yaoundé I?

Specific research questions

To what extent do Information and Communication Technologies (ICT) infrastructural dispositions influence the professionalisation of university studies in the University of Yaounde I?

To what extent does the availability of trained personnel influence the professionalisation of university studies in the University of Yaounde I?

What is the influence of ICT access on the professionalisation of university studies in the University of Yaounde I?

Research Hypotheses of the study

Main research Hypothesis

Ha: Information and Communication Technologies (ICT) integration has a statistically significant influence on the professionalisation of University studies in the University of Yaoundé I.

Ho: Information and Communication Technologies (ICT) integration has no statistically significant influence on the professionalisation of University studies at the university of Yaoundé I.

Specific Hypotheses.

Ha1: Information and Communication Technologies (ICT) infrastructural dispositions has a statistically significant influence on the professionalisation of university studies in the University of Yaounde I.

Ha2: The availability of trained lecturers significantly influences the Professionalisation of University studies at the University of Yaoundé I.

Ha3: Information and Communication Technologies (ICTs) Access are strong and positive determinants of the Professionalisation of University studies in the University of Yaoundé I.

Implication of the Study

This refers to the significance of the study. It is divided into two; that is; scientific significance and practical significance of the study.

Scientific Implications of the Study

Information and Communication Technologies (ICT) are increasingly used in higher education institutes and are established in theoretical and professional practice. Research in the Evaluation of Cameroon Government Information and Communication Technologies (ICT) Policy Papers and the Professionalism of University Students is critical to gain a wider understanding of the future directions of Information and Communication Technologies (ICT) in higher education. There were gaps in the research literature, particularly with respect to the evaluation of Cameroon Government Information and Communication Technologies (ICT) Policy Papers, the use of Information and Communication Technologies (ICT) in higher education and the Professionalism output of the students' concern. This research attempts to add to the knowledge and practice of Information and Communication Technologies (ICT) enablers in higher education in Cameroon with respect to policies and technical factors.

Practical Implications of the Study

The significance of this study will bring out the importance of the efficient application of Information and Communication Technologies (ICT) in the professionalism of individuals from different backgrounds and diverse fields of study.

This research is an important phenomenon for researchers, professionals and decision makers. The findings and conclusions of this study are useful for policy makers at national and international

levels. In conclusion, the research contributes to knowledge through the identification of factors influencing the use of Information and Communication Technologies (ICT) in higher education. Evaluating the Cameroon Government Information and Communication Technologies (ICT) Policy Papers in relation to the professionalisation of university students can enable policymakers, and educators to develop and implement a vision to manage the mismatches and shortfalls that threaten Cameroon's competitiveness and productivity and better match the skills of our labour market to what future jobs will require. Knowing the actual situation of Information and Communication Technologies (ICT) policies in Cameroon, it will enable us to tackle these shortfalls, anticipate the effects in the short and long term and mitigate the fallout.

Delimitation of the Study

The delimitation of the study here refers to the specific focus of the study.

Scientific delimitation of the study

The scientific delimitation takes into consideration the conceptual delimitation and the philosophical underpinnings of the study. Looking at the conceptual scope of the study, the study falls in the field of the science of education. It addresses the impact of Information and Communication Technologies (ICT) integration in universities in relation to the professionalisation of university studies. It explores concepts such as Information and Communication Technologies (ICT), technology, digital economy, integration, university, and professionalisation of studies.

Regarding the philosophical underpinnings of the study, the study adopted a pragmatic approach to study the problem of the study. Pragmatism was considered to be appropriate for this study because it gives room to the researcher to critically evaluate the effort being made to ensure the effective integration of Information and Communication Technologies (ICT) and how it can, in return act on graduate employability.

Scope Delimitation

The Scope of study will focus on the impact of Information and Communication Technologies (ICT)s on the professionalisation of university students from the University of Yaoundé I Cameroon.

This study makes use of quantitative research approach based on the descriptive survey design and results analyse using SPSS. This research has as objective to analyse the available facilities in Information and Communication Technologies (ICT) and their impact on professionalisation so as to be able to call the attention and involvement of stakeholders.

Spatial delimitation

This study is geographically delimited to the Department of Geography (Département de Géographie) at the University of Yaoundé I, located on the Ngoa-Ekelle campus in Yaoundé, Cameroon. The fieldwork and data collection will be conducted within the physical premises of the Department of Geography, including lecture halls, laboratories, departmental offices, staff rooms, and adjacent facilities used by geography students and staff (e.g., library sections, computer labs, and common study areas).

In addition, the study will include ICT resources and services directly managed by the Department and University IT services that affect departmental teaching and learning (e.g., departmental websites, learning management systems, campus Wi-Fi, computer labs, and institutional digital platforms). The research will not extend to other departments of the University of Yaoundé I, other universities, or the wider city of Yaoundé, except where comparative or contextual information from university-level administration or central IT services is necessary to explain departmental ICT policies and infrastructure.

Thematic delimitation

This study focuses on the integration of information and communication technologies (ICT) within teaching, learning, and professionalisation processes in the University of Yaoundé I with the case study from Department of Geography. The research examines three interrelated thematic areas: (1) the adoption and use of ICT tools and platforms for pedagogy (e.g., learning management systems, classroom technology, digital teaching materials); (2) the role of ICT in developing students' professional skills and employability (e.g., GIS, remote sensing, data analysis software, digital communication and collaboration tools); and (3) institutional and pedagogical factors that influence ICT uptake (e.g., staff training, departmental policies, access to infrastructure, and attitudes of lecturers and students).

The study emphasizes practices, perceptions and outcomes directly linked to teaching and professional training rather than broader societal or technical dimensions of ICT. It does not

investigate in detail the technical engineering of ICT infrastructure (e.g., network architecture, server maintenance), nor does it cover the entire university's ICT strategy except where university-level policies directly affect the Department of Geography. Likewise, while student digital literacy and employment outcomes are investigated as they relate to professionalisation.

The Time Factor delimitation

This study is temporally delimited to the academic year 2024–2025

2024–2025. Primary data collection (surveys, interviews, classroom observations, and skills assessments) will take place during this academic year. The research will also consider retrospective information on ICT adoption and professionalisation at the Department of Geography from the preceding five years (2019–2024) to provide contextual background and to identify recent trends and developments. Historical events or long-term trends before 2019 will be used only when directly relevant to understanding current ICT practices or institutional policies, but they are not the main focus of the analysis.

Justification of the study

The University of Yaoundé I campus lacks a comprehensive and accessible campus map (interactive or static) that shows the location of faculties, departments, and ICT-related facilities. Despite hosting the Department of Geography, a unit with expertise in spatial analysis and mapping, there is no campus map to guide students, staff, visitors, or administrators to physical resources such as computer labs, GIS/remote sensing facilities, Wi-Fi zones, lecture halls, and libraries.

Therefore, findings will produce concrete recommendations for departmental and university decision-makers and enable efficient and equitable allocation of ICT resources, improving return on investment and educational outcomes.

Definition of key terms

ICT (Information and Communication Technology)

A Computer is an electronic device used for storing and processing data, typically in binary form, according to instructions given to it in a variable program in the late years of 1980s, (Oxford dictionary). It was later replaced by 'IT' (information technology), signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the

introduction of the term ‘ICT’ (information and communication technologies) around 1992, when email started to become available to the general public Pelgrum and Law, (2003).

The United Nations Development Program (UNDP) hence defines Information and Communication Technologies (ICT) as follows :

Information and Communication Technologies (ICT) are basically information handling tools — a varied set of goods, applications, and services that are used to produce, store, process, distribute and exchange information. They include the “old” Information and Communication Technologies (ICT)s of radio, television and telephone, and the “new” Information And Communication Technologies (ICT)s of computers, satellites and wireless technology and the Internet. These different tools are now able to work together, and combine to form our “networked world”, a massive infrastructure of interconnected telephone services, standardised computer hardware, the Internet, radio and television, which reaches into every corner of the globe UNESCO, (2002).

Additionally, Information and communications technology comprises computers, software, networks, satellite links and related systems that allow people to access, analyse, create, exchange and use data, information and knowledge in ways that were almost unimaginable Association of African Universities, (2000). The prevalence and rapid development of Information and Communication Technologies (ICTs)s has transformed human society from the information technology age to the knowledge age Galbreath, (2000).

ICT (Information and Communication Technology) in Education

With regards to education, Vermeulend, van Buuren, and van Acker, (2014) defines Information and Communication Technologies (ICT) as a set of tools enabling, supporting, and reinforcing educational reform. Hence integrating these tools into education will potentially prepare students for life in the 21st century. (Ghavifekr, et al.) Integration of Information and Communication Technologies (ICT)s in education is defined by (Mahmud & Arif, 2008) as the process of determining where and how technology fits in the teaching and learning scenario.

Hence, Information and Communication Technologies (ICT) in education refers to Learning through Information and Communication Technologies (ICT)’, which refers to the integration of

Information and Communication Technologies (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 term ‘curriculum’ here denotes the contents and processes of learning in schools as well as the outcomes Pelgrum and Law, (2003) of learning, such as high performance, skills and the professionalism of university students. Information and Communication Technologies (ICT) knowledge is necessary at all educational levels for teachers and students, regardless of subjects taught and degrees obtained Chen, Castillo, and Ligon, (2015).

University

In 1970 at the celebration of the transformation of the University of Dar Es Salaam into an independent national university, the President of Tanzania described the university as an “institution of higher learning, a place where people's minds are trained for clear thinking, for independent thinking, for analysis, and for problem-solving at the highest level Nyerere, (1970) cited in Armel & Shizhou, (2022). The three missions of the university identified in his description are elaborated as follows;

The university is considered a place to transmit advanced knowledge from one generation to another so that it can be used as a basis for action or as a springboard for further research hence, the regeneration of knowledge;

It is also an institution that provides a center for the attempt to advance the frontiers of knowledge by concentrating in one place some of the most intellectually able people who are not preoccupied with day-to-day administrative or professional responsibilities, and making available to them good library and laboratory facilities that are required.

Information and Communication Technologies (ICT) Policy Papers

Policy is a set of principles or a broad course of action that guides the behavior of governments, organisations, corporations and individuals. It bridges the gap between the vision of where we want to be and the plans that enable us to get there. For governments, policy is a tool to promote national vision and the basis for the legislation and regulation through which it is implemented Bass, (2012).

Thus, Government Information and Communication Technologies (ICT) Policy papers are official documents outlining the government's strategies, plans, and regulations related to Information and

Communication Technology. Government Information and Communication Technologies (ICT) policy exploits information and communication technologies to further national economic and social goals.

Educational Information and Communication Technologies (ICT) Policy Papers

In recent years, Governments all over the world, have adopted plans that have, addressed the issues relating to Information and Communication Technologies (ICT) integration in schools in different aspects Pelgrum and Law, (2003). These plans are essentially for reforming education from a system which is mainly teacher-directed to one that encourages more student-centred learning.

At the educational level, policies must be formulated as well. Complete Educational Information and Communication Technologies (ICT) policies set out the foundation for the teaching and learning of Information and Communication Technologies (ICT), as well as the aims and objectives for Information and Communication Technologies (ICT) philosophy and wider frameworks. It gives clear guidance on the types of equipment, programs and measures that need to be put in place if the requirements of the policy are to be taken into consideration. The central aim of the policy is to provide a broad, balanced and challenging range of Information and Communication Technologies (ICT) opportunities for the students, to effectively prepare them for a future role in society BECTA, (2009).

An effective Information and Communication Technologies (ICT) policy must be a concise and accessible document that informs and directs the teaching of Information and Communication Technologies (ICT) within the school. The policy must be subject to initial agreement by the governing body and the staff, and they should undertake regular reviews in common with all the other institution policies. The priorities need to be reflected in the institution's Information and Communication Technologies (ICT) development plan, and the Information and Communication Technologies (ICT) priorities and associated budget Nangue , (2011).

Professionalisation

Professionalisation, in addition to specific behaviours and communication skills required to successfully perform in a certain speciality, includes competency, which is the ability to perform a certain task required for a work situation Alexander and Clin, (2012). It follows that, combination of skills such as teamwork, problem-solving, information communication technology, and

communication and language skills enables graduates to adapt to the changes of the new knowledge-based economy UNESCO-UNEVOC, (2013).

Therefore, in addition to being a valid goal for education, Information And Communication Technologies (ICT) is also a means to an end (Collins, 1991; David, 1991; Sheingold, Hadley, and Center for Technology in Education, 1990) cited by Chen, Castillo, and Ligon, (2015) hence, the effective usage of Information and Communication Technologies (ICT) expands learning and knowledge on local, national and global levels.

Information and Communication Technologies (ICT) Infrastructure

Information and Communication Technologies (ICT) infrastructure refers to hardware, software and network connectivity. Information and Communication Technologies (ICT) infrastructure in education is used to support ‘learning with Information and Communication Technologies (ICT)’ and ‘learning through Information and Communication Technologies (ICT) Pelgrum and Law, (2003).

They stated that, Collis, (1997) distinguished several important dimensions in the Classification of Information and Communication Technologies (ICT) infrastructure in education:

The stand-alone versus distributed dimension: if software is only locally available (most typically on a local CD-ROM) or accessible from remote locations (generally, this will be via web-based systems, intranet or Internet);

The producer versus consumer dimension: if the digital materials are being made by the children and teachers themselves, or if they are made by others and accessed by the children and their teachers; and

the structured versus learner-controlled dimension: the degree to which a pre-determined learning route is designed into materials (tutorials and some simulations) versus their being used as exploratory environments or as hyperlinked encyclopedias of resource materials.

CHAPTER 2

LITERATURE REVIEW AND THE THEORITICAL FRAMEWORK

The growing integration of Information and Communication Technologies (ICT) in various sectors has triggered significant transformations in educational systems worldwide. Governments, particularly in developing nations like Cameroon, have increasingly recognized the potential of Information and Communication Technologies (ICT) as a driver for innovation, economic development, and educational reform. In recent years, Cameroon's government has enacted several Information and Communication Technologies (ICT) policy papers aimed at fostering digital growth, expanding Information and Communication Technologies (ICT) infrastructure, and promoting Information and Communication Technologies (ICT) literacy across multiple sectors, including higher education. These policies are designed to support the nation's broader goals of digital inclusion and sustainable development.

This literature review seeks to examine existing scholarly discourse on Cameroon's Information and Communication Technologies (ICT) policy initiatives, their impact on higher education, and the nexus between Information and Communication Technologies (ICT) policies and the professionalisation of university studies. By evaluating previous research, reports, and policy documents, this review will provide an understanding of the challenges and opportunities in integrating Information and Communication Technologies (ICT) within university education in Cameroon and its implications for improving the employability and competencies of graduates in a globalised economy.

Conceptual Review

Overview of Information and Communication Technologies (ICT)

In the UNESCO training module for Information and Communication Technologies (ICT), ICTs are described as the technologies that enable society to create, collect, consolidate, communicate, manage and process information in multimedia and various digital formats for different purposes. Computing and telecommunications technologies like personal computers, CD-ROM, cable TV, cellular phones and the Internet. Information communication technologies can be split into three components: the technology part; information that the technology helps deliver; and a communication process that the technology facilitates and serves as a medium for the information Mane, (2018).

Conferring to Marshall G, (1984) IT is the coming together of computing and telecommunications for the purpose of handling information; the application of technologies to information handling; including generation, storage, processing, retrieval and dissemination.

Thus, Information and Technology (IT) is more than computers and networks where the information flows through technology Mane (2018). In this light, Thakur et Uikey (2018) describe Information and Communications Technology as an advanced version of the information technologies which combine the different technologies to provide digital educational contents like wireless as well as wired platforms of information sharing, hence leading us to Information and Communication Technologies (ICT) in Education.

The UNDP describes Information and Communication Technologies (ICTs) as principally information handling tools, a varied set of goods, applications, and services that are used to produce, store, process, distribute and exchange information. They include the “old” Information and Communication Technologies (ICT)s of radio, television and telephone, and the “new” Information and Communication Technologies (ICT)s of computers, satellites and wireless technology. According to Asabere (2012) cited by Reetesh (2014), Information and Communication Technologies (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computers, networks, hardware, software, satellite systems, as well as the various services and applications associated with them.

Information and Communication Technologies (ICT) are often used in a particular context, in education, health care, or libraries. In the government and Educational milieu, the term Information Technology (IT) is sometimes preferred. Information Technology takes its origins in the 80s when the term ‘Computer’ was replaced by Information Technology (IT) because of a shift of focus from computing technology to the capacity to store and retrieve information. The term IT in its modern sense first appeared in a 1958 article published in the Harvard Business Review, in which authors Leavitt and Whisler commented that “the new technology does not yet have a single established name. We shall call it information technology” Leavitt and Whisler, (1958). This was followed by the introduction of the term ‘information and communication technologies’ around 1992, when email started to become available, hence these activities involves collaboration and communication (Pelgrum and Law, (2003).

Likewise, Mahmood and Badia, (2019) expatiate on Information and communication technology (ICT) as a universal and similar concept with information technology (IT) that signifies not only a distinct unit of technology but a collection of technologies like telecommunications facilities, data processing facilities, semi-conductors, consumer electronics. It follows that, Information Technology comprises the acquisition, processing, organisation and dissemination of information-textual, numerical, photographic and vocal. It is considered as a broad-based term comprising the acquisition, organisation, storage and retrieval of information in multimedia, using a combination of computer and telecommunication gadgets.

Stages of Information and Communication Technologies (ICT)

Information and Communication Technologies (ICT) development in education is classified in range. The educational institution and Universities can be mapped depending on the stages of ICT development. These stages are considered to be developing, applying, infusing and transforming stages of ICT development, mapped depending on pedagogical usages of ICT

Containment/Development/Modernisation.

Modernisation refers to a transitional process of moving from “traditional” or “primitive” communities to modern societies based on scientific rationality, abstract thought, and the belief in progress. It included urbanisation, economic growth, and psychic mobility that could be influenced by types of media. Scholars talked of an eventual takeoff if the proper regiment was followed, particularly the adoption of new agricultural techniques termed the “Green Revolution (Rostow, 1960). Information and Communications Technologies (ICTs) were rarely stressed, but “five communication revolutions; print, film, radio, television, and later, satellites were beginning to be recognized as making a contribution to national development. Mass Media and National Development made crucial links between media and national development.

New World Economic and Information Orders

The Commission consisted of seventeen members – communication elites from both private and public sectors and representing a number of countries. Spurred on by the growing optimism about the development potential of telecommunications, they investigated ways Third World countries could be supported in this area. They published their recommendations in The Missing Link (1984) or what soon was to be called the “Maitland Report” after its Chair, Sir Donald Maitland from the

United Kingdom. This report brought recognition to the role of telecommunications in development and opened up resources by international organisations such as the World Bank.

The transition from telegraph and telex machines to computers also resulted in concerns about data transcending national boundaries. The Intergovernmental Bureau for Informatics (IBI) that had been set up as the International Computation Centre (ICC) in 1951 to help countries get access to major computers, began to study national computerisation policy issues in the mid-1970s. (Majid , 1999)

Structural Adjustment and Re-subordination

It is an era of structural adjustment enforced by the International Monetary Fund emerged that targeted national post, telephone, and telegraph (PTT) agencies and other aspects of government administration and ownership. It includes Global circuits of digital money and news emerged, such as Reuters Money Monitor Rates and SWIFT (Society for Worldwide Interbank Telecommunications). These networks, the first to use packet-switching, linked currency exchange markets worldwide in arguably the first virtual market. A new techno-economic imperative emerged that changed the relationship between government agencies and global capital. PC-spreadsheet technologies were utilized to inventory, value, and privatize PTTs so they could be corporatized and listed on electronically linked share-market exchanges Wriston, (1992).

Global Information and Communication Technologies (ICT) Integration

The Global Information Infrastructure (GII) introduced at the annual ITU meeting in Buenos Aires in March of 1994 by Vice President Gore targeted national PTT monopolies and government regulatory agencies. He proposed a new model of global telecommunications based on competition, instead of monopoly. He stressed the rule of law and the interconnection of networks to existing networks at fair prices. Gore followed up the next month in Marrakesh, Morocco, at the closing meeting of the Uruguay Round of the GATT (General Agreement on Tariffs and Trade) negotiations which called for the inclusion of GATS (General Agreement on Trade in Services) that include everything from ciruses, to education, radio and television, and telecommunications services. And, at this meeting, they called for the creation of the World Trade Organisation (WTO).

Formed in 1995, the WTO had two meetings in 1996 and 1997 that created a new era of global communications and development. The online economy emerged with the Internet and its

hypertext click environment. Starting with advertising and the keyword search and auctioning system, a new means of economic production and political participation based on the wide-scale collection and rendition of surplus behavioural data emerged for predicting products and services. When the Internet was privatised in the early 1990s and the World Wide Web (WWW) established the protocols for hypertext and webpages, new virtual worlds of online media spaces were enabled. These were called inventory, or you can call them ad space.

Smart/Sustainable Mobile and Data-Centric Development

The aggressive trade negotiations and agreements in the 1990s significantly reduced the costs of Information and Communication Technologies (ICT) devices and communication exchanges worldwide, making possible a wide variety of new commercial and development activities based on Information and Communication Technologies (ICT) capabilities. Here, ICT4D is highly reliant on global supply chains, making digital devices readily available at reasonable prices. The near-zero marginal costs for digital products make information content and services more accessible for developing countries. Books, MOOCs, and other online services provide value to a vast population with minimal costs to reach each additional person. Platform-based services providing agricultural, health, and other development services provide low-cost accessibility and outreach. They allow new applications to scale significantly with low costs. Mobility, broadband, and cloud services are three significant technologies presenting positive prospects for ICT4D Pennings, (2020).

The Integration of Information and Communication Technologies (ICT) into Cameroon's Higher Education

The integration of Information and Communication Technology (ICT) into higher education is a global phenomenon that has transformed teaching, learning, and administration in universities. In Cameroon, this transition has been slow but significant. Despite numerous challenges, there is growing recognition of the potential Information and Communication Technologies (ICT) holds to improve the quality of education and enhance the professionalism of students. This literature review explores the current state of Information and Communication Technologies (ICT) integration into Cameroon's higher education, examining government policies, infrastructural challenges, pedagogical shifts, and the impact on students and educators.

Infrastructure is a major barrier to the effective integration of Information and Communication Technologies (ICT) in Cameroon's universities. According to Ndongfack, (2015), many institutions lack the necessary technological infrastructure, such as computers, stable internet connectivity, and up-to-date software. Moreover, the cost of internet access remains prohibitively high for many students, and power outages frequently disrupt Information and Communication Technologies (ICT)-related activities on campuses Ngassa and Nkengla, (2020).

Even in urban universities, where technological access is relatively better, there is a significant digital divide between students who can afford personal devices and those who cannot. This disparity limits equitable access to digital resources and creates an uneven playing field among students.

Cameroon's Information and Communication Technologies (ICT) Policy Framework in Education

The Cameroon government has made advances toward adopting Information and Communication Technologies (ICT) in higher education, primarily through its National Information and Communication Technologies (ICT) Policy Plan (2007) and subsequent updates in the Growth and Employment Strategy Paper GESP) (2010). The National Information and Communication Technologies (ICT) Policy highlights the government's commitment to promoting digital literacy, improving infrastructure, and integrating Information and Communication Technologies (ICT) into the educational curriculum. The document outlines key objectives such as equipping universities with modern technology, promoting e-learning, and fostering partnerships between academic institutions and industries.

The E-National Higher Education Program (2016), also known as University Digital Economy, was another landmark policy that aimed at equipping Cameroon's higher education institutions with laptops and internet facilities. This program seeks to enhance the digital skills of university students, making them more competitive in the professional job market. A critical evaluation of these policies reveals a consistent focus on using Information and Communication Technologies (ICT) as a means to improve the professional competencies of students through digital literacy and real-world problem-solving skills.

However, there are significant challenges, including inadequate infrastructure, uneven access to technology across urban and rural areas, and limited funding for sustained Information and

Communication Technologies (ICT) programs Nkwenti, (2021). These issues highlight a gap between policy ambitions and practical implementation, a challenge that is common in many developing countries.

Concept of Professionalisation in Education

The concept of professionalisation in higher education refers to the process of aligning academic curricula with the skills and competencies required in the professional world. According to Eraut, (1994) professionalisation in education entails embedding practical, job-related skills within the learning environment, ensuring that students are prepared for employment post-graduation. In Cameroon, the push for professionalisation in university studies has been a key focus of the Bologna Process, which aims to standardise degree structures and promote employability.

The professionalisation of university curricula in Cameroon has seen some progress, particularly in fields like engineering, Information and Communication Technologies (ICT), and business, where internship programs and partnerships with industries are becoming more common. However, there are still concerns regarding the disconnect between theoretical knowledge and practical application in many degree programs Tazanu, (2020). Despite government efforts, the slow pace of curriculum reform has been a major obstacle, with many universities still focusing predominantly on theory-based education.

Information and Communication Technologies (ICT) is seen as a critical tool for bridging this gap. Through the use of Information and Communication Technologies (ICT) platforms, students can engage in virtual internships, access professional databases, and participate in online learning communities that mirror real-world work environments. As noted by Donnelly, (2018), Information and Communication Technologies (ICT) enables universities to integrate professionalisation opportunities into their curricula by providing access to global knowledge networks, online certification programs, and digital professional tools

The Role of Industry-University Partnerships in Information and Communication Technologies (ICT) Policy

Effective Information and Communication Technologies (ICT) policies in education must also involve collaborations between universities and the private sector. The Cameroon government's Information and Communication Technologies (ICT) policies stress the importance of building industry-academic linkages to foster professionalisation. According to Etomes et al. (2019),

partnerships between universities and Information and Communication Technologies (ICT) industries can facilitate the transfer of technology, skills, and professional practices to students. Such collaborations allow universities to keep their curricula updated with the latest industry trends, ensuring that graduates are job-ready.

However, despite the policy emphasis, actual partnerships between universities and industry have been limited. This can be attributed to the weakness of the Information and Communication Technologies (ICT) sector in Cameroon, the lack of incentives for private companies to invest in education, and the reluctance of academic institutions to embrace digital transformation. Addressing these challenges is essential for the successful professionalisation of university studies through Information and Communication Technologies (ICT).

Challenges to Information and Communication Technologies (ICT) Implementation and Professionalisation

Despite ambitious policy goals, the integration of Information and Communication Technologies (ICT) into the professionalisation of university studies in Cameroon faces several obstacles. Infrastructure deficiencies, including limited internet access, outdated technology, and inadequate training for staff, remain major barriers Amin, (2017). Additionally, financial constraints hinder the full implementation of Information and Communication Technologies (ICT) policies, as many universities struggle to afford the required technological investments.

Moreover, the digital divide between urban and rural universities exacerbates inequalities, leaving students in less developed areas with fewer opportunities to benefit from Information and Communication Technologies (ICT)-driven professionalisation. These challenges underscore the need for more targeted investments and reforms to ensure that government Information and Communication Technologies (ICT) policies can achieve their intended impact on university education.

In summary, the integration of Information and Communication Technologies (ICT) in higher education in Cameroon, as outlined in government policy papers, presents significant potential for professionalizing university studies. Theoretical frameworks, such as Constructivism and Connectivism, offer strong support for the use of Information and Communication Technologies (ICT) to enhance student engagement and professional skills. While the government has made

commendable efforts through policies like the E-National Higher Education Program, challenges such as inadequate infrastructure, limited partnerships, and the digital divide hinder full realisation of these goals. To bridge the gap between theory and practice, ongoing reforms and stronger industry-academic collaborations are needed to fully capitalize on the benefits of Information and Communication Technologies (ICT) in professionalizing university studies.

The Professionalisation of University Students

In most educational institutions, the organisation of the learning process can be characterised as being predominantly 'teacher-controlled'; usually, the teachers (or lecturers) fully regulate the learning process. If education is to provide adequate preparation for the future, the information society schools must empower learners to become more active and more responsible for arranging their learning process.

Learning has to become more student-directed; learning needs to continue not only beyond compulsory schooling, but more importantly, as a lifelong enterprise. Only through student-directed modes of learning can learners acquire 'productive' skills, problem-solving skills, independent learning skills, and skills for lifelong learning. Learning has to be organised so that learners can learn how to become (more or less) architects of their learning processes, with the help of professional coaches, teachers, and others Pelgrum & Law, (2003).

Information and Communication Technologies (ICT) Infrastructures and the professionalisation of universities in Cameroon

Bernheim & Chau, (2003) in their report on the state of universities describe a contemporary society as one which is driven by the competitive use of knowledge and of technological innovations. Knowledge, technology and technological innovation are the key aspect in an outstanding economy because knowledge is the pillar of the wealth and power of nations. Hence, the new economy consists of the emergence of a productive paradigm in which the most important factor ceases to be the availability of capital, labor, raw materials or energy and becomes the intensive use of knowledge and information Rifkin, (2000).

This explains why today's most advanced economies are based on the greatest availability of knowledge and technological innovations. Economic power is therefor based on the possession of information, technology and innovation, which has become a secret to economic and a military competition.

Technology and technological innovation has led to an increased in knowledge. Internationally recorded discipline-based knowledge took 1,750 years to double for the first time, counting from the start of the Christian era; it then doubled in volume every 150 years and then every 50. It now doubles every five years and it was projected that by 2020 knowledge will double every 73 days. It is estimated that every four years the amount of information available in the world doubles.

Thus, *without adequate higher education and research institutions providing a critical mass of skilled and educated people, no country can ensure genuine endogenous and sustainable development and, in particular, developing countries and least developed countries cannot reduce the gap separating them from the industrially developed ones* UNESCO, (1998).

Again, The World Bank Declaration on Higher Education states in Article 1: *the core missions and values of higher education, in particular the mission to contribute to the sustainable development and improvement of society as a whole, should be preserved, reinforced and further expanded". Reinforcing and expanding higher education result to a knowledge society, hence it "implies increasing technological capacities by combining traditional and modern methodologies to stimulate scientific creation and lead to sustainable human development.* World Bank and UNESCO (2000).

It follows that, the growing internationalisation of higher education is first and foremost a reflection of the global character of learning and research. This universal context is should be reinforced by the of economic and political integration, the growing need for intercultural understanding and the global nature of modern communications, consumer and markets UNESCO, (1996).

According to Bernheim & Chaui , (2003), The main aim of University education from the onset is to pursued the objective of creating, transmitting and disseminating knowledge. This consideration has given rise to the analysis of the relations between higher education institutions and society and to greater relevance of the strategic role of higher education. Therefor, *"Today, more than ever before in human history, the wealth or poverty of nations depends on the quality of higher education."* Malcolm Gillis, President of Rice University, cited in the report of the Task Force on Higher Education and Society of the World Bank and UNESCO World Bank, (2000).

Owing to the scope and pace of change, society has become increasingly knowledge-based so that higher learning and research now act as essential components of cultural, socio-economic and environmentally sustainable development of individuals, communities and nations. Higher education itself is confronted, therefore with difficult challenges and must proceed to the most radical change and renewal it has ever been required to undertake, so that our society, which is currently undergoing a profound crisis of values, can transcend mere economic considerations and incorporate deeper dimensions of morality and spirituality. Therefore, higher education institutions should preserve and develop their crucial functions, through the exercise of ethics and scientific and intellectual rigour in their various activities UNESCO, (1998).

Information and Communication Technologies (ICT) skills and the professionalisation of University Students

(Thakur & Uikey, 2018) in their comparative analysis of digital education technology and its impact on educational study and growth report that, over the past decade governments have invested significantly in digital education. Following such investments, the Cameroon government included the development of infrastructure and the modernisation of the production processes of the national economy, "education" with the objective to create a strong base in technological infrastructure, digital resources '(MINEPAT, 2013; Ministry of Economy, 2009, p.78). Cited by Armel and Shizhou, (2022).

In the meantime, the Digital Education Revolution activity has created awareness of universities in the utilisation of digital technology. One of the major challenge now facing Educations is to build on this capacity, putting further investment in Information and Communication Technologies (ICT) literacy and skills acquisition by focusing on the new advances utilisation and engaging ways of learning and teaching new skills. By taking this step, the government will thus equip learners and teachers to meet the difficulties of a quickly evolving world Murray & James , (2011).

For governments to achieve a high quality learning, outcomes they considered a wide range of initiatives proposed by a Panel of Experts on Learning in their literature which include online cooperation by households, online involvement by businesses and NGOs, smart environment and infrastructure management, health care, online education expedition, increased use of teleworking, online government service and delivery enhancement.

It follows that, in order to gain Information and Communication Technologies (ICT) skills and literacy, Information and Communication Technologies (ICT) in education should not be limited to a subject but should be taught with the learning outcome aiming at skills and literacy development Ahmed A, (2016). Therefore, there is a crucial necessity to improve the way in which Information and Communication Technologies (ICT) is used in education so that learners get the benefits of developments done in information technology Bandyopadhyay and Thakur, (2016) in their research deduce that.

It follows that, people in less-developed countries are using social networking sites, more actively than people in more-developed countries for social and entertainment purposes rather than for education Poushter, Bishop, & Chwe , (2018), therefore, students in higher education are already familiar with social media but they face the challenges of using IT educational base programs and open source software technologies to support education because of lack of knowledge and skills.

Again, what is being learned depends on the type of education provided by the educational system. The curriculum contents will therefore determine the skills and knowledge of students in every field and in ICTs. Education is supposed to prepare students for the use of Information and Communication Technologies (ICT) for research, future occupation and social life. Consequently, Information and Communication Technologies (ICT) acts as an assisting tool, such as in making assignments, collecting data and documentation and for communicating and conducting research Murray and James, (2013); FOLDOC,(2008) is also a tool for teaching and learning

The Open learning software programs for teaching and learning has excellent privileged such as personalizing the learning environment, tailored toward students individual differences such as the progression level, pace, interests, learning style, and background. It provides the support and challenges required to keep students engaged and motivated. Such platforms empowers students to reach their potential and promote greater community involvement by helping parents and community members to involvement in student learning .Results in this work segment shows that, in order to ripe benefits of ICTs in education, apart from updating the curriculum to harbor a fertile ground for Information and Communication Technologies (ICT) knowledge and skills, we equally need highly effective teachers Mendro, (1998).

In a study carried by Nwaozuzu, (2017) technology has become more global, and more embedded in our culture, homes, schools, and work places, hence, the need for educators to equip pupils and

young people in general with the relevant experience that prepares them for life beyond school, thus suggesting the need for a change in what we learn and how we learn it. John and Wheeler, (2012) cited by Nwaozuzu, (2017).

It follows that, this infusion of various information and communication technologies in schools has made provision for generic skills and expected outcomes globally from compulsory education generic skills. The Cameroon policy makers and government should put focus to intergrate this into the education system as seen in the case where after the the meetings of the Heads of States and Governments at Lisbon in 2000 recommended the use of Information And Communication Technologies (ICT) as a priority area in education and training in the EU States in a bid to achieve its vision to be the ‘world’s most competitive and dynamic knowledge driven economy’ by the year 2010 Kok, (2004).

Therefore, most Member States of the Organisation for Economic Co-operation and Development (OECD) reviewed their policies and educational systems, changed their curriculum to equip young school leavers with 21st-century skills. The Scottish Government (2004), via the curriculum as a priority area broadened the range of learning experiences for young people, equipping them with core generic skills. They plan the skills and competences that young people would require for living and the workplace in preparation to face globalisation and its associated demands.

As a result, young people will meet basic literacy and numeracy standards, and overall levels of literacy and numeracy are improving, students will excel by international standards, young people will make the successful transition from school to work and further study. Education will therefor promote social inclusion. Thakur & Uikey, (2018). In a research study carried by Tchome, et al., (2008) noted that, in order to achieve Information and Communication Technologies (ICT) literacy and quality research in higher education, the educational system should handle the state of Information and Communication Technologies (ICT) in secondary education

Empirical review

ICT Infrastructure

In a study by Crockett, Akame, and Anoma, (2021), aiming to promote Goal 4 of the United Nation’s 2030 Agenda for Sustainable Development to ensure equitable and sustainable digital access for students, they points out that, the United Nations General Assembly declared access to

the internet was a human right but then, in sub-Sahara Africa, digital access is afflicted by inequalities. These inequalities such as Limited digital infrastructure, unreliable electricity support, high financial costs and limited digital skills amongst school stakeholders have deter adequate understanding and application of digital tools in learning and teaching in the region.

Findings from this research uncover that infrastructural challenges such as limited or no electricity and limited or no internet connectivity, lack of digital hardware, and limited IT skills are key obstacles student in Southwest Cameroon. ICT Infrastructure deficiency is a setback to learning since student already have firsthand knowledge in online studies. Bediang, et al., (2013) assert that the major challenge of the university students at the Faculty of Medicine and Biosciences is infrastructure as these students have basic skill in ICTs. These students were born when computers and Internet became available throughout the world while the lecturers are from a generation who witnessed the emergence of computers and Internet teaching.

Students now attending primary, secondary, and high schools belong to the digital era Thus, for children to exercise their right to education, ICT infrastructure and skills must be developed in the region. Therefore, Students require access to digital hardware, stable electricity, and reliable Internet. Schools, parents/guardians, and community organisations have a responsibility to support a child's right to education and to present the challenges that infrastructural limitations present for education in this digital era, but government involvement is critical to bring about long term change and the overall stabilisation of ICT infrastructure.

In a research on advancing the digital transformation of higher education in Cameroon, Jeremie and Ru, (2023) assets that technological innovation is rapidly transforming the global business and education landscape. Countries with strong economies give credit to digital innovation, they benefit positive social and cultural changes. Higher education in these countries lay emphasis on digital skills so as to meet up with the demand of the labor market. Therefore, heavy public sector spending on infrastructure is a favorable component to boost economic growth. In the same light, heavy investment in infrastructure, personnel and equipment in higher education will enhance the professionalisation process in higher education Robert, (2013).

Findings in this study reveals that Cameroon's higher education will therefore have to deal with challenges in digital transformation, which comprises a lack of digital infrastructure and internet access, and insufficient university budgets. As such, the ministry of higher education quarterly

review, SUP INFOS, (2010c) states that, one of the roles of higher education (HE), is to increase the socio-economic, socio-professional and market friendliness of the curriculum. This role was re-conceptualized in their New University Governance Policy (NUGP), with the objective of acquiring: a modern, professionalized higher education which is resolutely open to the rest of the society and meeting the requirements of knowledge production, of knowhow, of the use of knowledge and the production of human capital, quantitatively and qualitatively which is necessary to drive Cameroon to become an emergent nation by 2035 (Operational Strategy of the NUGP up to 2010:2).

This can only be achieved if our universities can be up to date with the state of the art infrastructure, updated library facilities and the new information and communication technologies. But then little has been done on improving the ICT infrastructure of Higher Education. The root cause of these challenges can be directed to the central government's lack of funding, lack of international cooperation and poor governance. To address these issues and advance digital transformation in Cameroon's higher education sector, the study recommends increasing investment in digital infrastructure and internet access, strengthening international partnership and improving investment and governance for long life learning in the digital age.

Findings by Njebakal & Teneng, (2017) to determine the employability and graduate destinations in terms of finding a good paying job as the result of digital technology in the teaching and learning process in Higher education in Cameroon reveals that, students who graduate from the university are likely to swell the ranks of unemployment in the country.

It follows that, for a country to ensure a competitive edge in the global market, universities should accelerate and smooth the shift to the new knowledge-based economies and high-technologies through appropriate and effective linkages between research and the labor market to ensure that their countries have a competitive advantage in the global market UNESCO, (2009).

Whereas, employment hardly reflects the level of education and training of university students, leading to underemployment. Hence, graduates are uncertain as to where they will go after university education. The results of their findings were that, equipping universities with digital technological gadgets and ICT facilitating tools, as well as having good internet connectivity, having updated online learning platforms will empower a university to professionalize learners and in turn, graduates will be sure of finding good graduate jobs in a constantly demanding labor

market. Cameroonian higher education must digitalize its infrastructure and train its manpower on the use of digital technologies and ICTs.

Findings by Ngu and Teneng, (2020) assess the impact of policy implementation on the employability of students. Results from this study emphasized that, educational policies in the education and training of students is poor, and thus falls short of qualifying students for quality jobs. It follows that, equipping education with adequate 21st-century policies and framework, curricula, and infrastructure, and the right partnerships will help students inculcate appropriate skills to help learners easily integrate into the global labor market. In this way, universities can be sure of producing professional graduates with pre-determined graduate destinations in terms of finding wage-paying jobs and being flexible in the world of work.

Technology alone does not guarantee that ICTs will improve access, nor will ICTs transform teaching and learning, nor achieve the professionalism of university students. In order to benefit from technologies and gain a competitive place in the global market, there needs to be a clear framework which sets the scene and provides the enabling for technologies to be integrated, deployed and used to their fullest potential. Whereas, in Cameroon, there is no well-elaborated educational ICT policy and framework for higher education Bass, (2012).

Further research in the global economy attests that, in order for developing countries to participate in the global economy and ensure sustainable national development, it is necessary for governments to give high priority to education. Government need to develop a vibrant education system People - ICT - Development, (2007).

In this light, Foche, George, and Mohamadou, (2016) assessed the influence of resource input in the Professionalisation of Higher Education with regards to equipping young graduates with professional skills and competences in order to participate in the global economy and ensure sustainable national development. Findings in this research reveals that, in Cameroon, the 1993 University Reforms, the Bologna process 1995, the 2001 Orientation Law on Higher Education, the 2007 Bachelor-Masters-Doctorate (BMD) Higher Education reforms and the 2008 new University Governance Program amongst other things have restructured governance and professionalisation in the country's Higher Education system. But then, reforms, developments, and modernisation particularly in teaching and learning, is only possible when an adequate technology is waiting to be endorsed Saif, et al., (2022).

Consequently, effective management at all levels of higher education institutions will ensure institutional quality and enhance innovation Marshall, Orrell, Cameron, Bosanquet, and Thomas, (2011) cited by Foche, George, and Mohamadou, (2016). Accordingly, infrastructural and personnel governance is vital for quality and enhance innovation Baldwin, (2009). Unfortunately, higher education institutions in Africa according to Teshome, (2008) have seen little or no infrastructure improvements for the last few decades. Learning infrastructural deficiencies in internet access, library, textbooks, equipment, laboratories and classroom space are critical blockages resulting in deterioration of quality of education and learning.

The poor state of facilities also affects the quality of research and its ability to contribute to societal development and progress. The authors emphasized that, Africa's higher education institutions face a decline in quality of education, learning and research. Universities operate amongst other limitations with little and deteriorating physical facilities, limited and obsolete library resources, insufficient equipment and instructional materials, outdated curricula, unqualified teaching staff, poorly prepared secondary school students, and an absence of academic rigor and systematic evaluation of performance. As a result, insufficient infrastructure and equipment, and averagely, teaching personnel reflects professionalisation. Gibb & Haskins, (2012) Explore key issues in the design and development of the entrepreneurial university in both concept and practice, as policy makers and stakeholders across the world attempt to adjust to a growing complex and uncertainty environment are adjusting the organisational design of universities. Kweik, (2001), 2005b; Lazzeroni and Piccaluga, (2003); Higher Education in Europe, (2004); UNESCO, (2004, 2007); OECD, (2001, 2003, 2005, 2007, 2011); Bernasconi, (2005); Williams and Kitaev, (2005); Kirby, (2006); Wissema, (2008); Pilbeam, (2008); Shattock, (2009); Chan and Lo, (2007); Ernst and Young, (2012) as cited in Gibb & Haskins, (2012).

The entrepreneurial University here refers to a wide range of institutional activities designed to facilitate the commercial exploitation of academic intellectual property Ranga, (2002; Cook et al., (2008); Hofer and Potter, (2010). The Entrepreneurial University in its role to develop the "entrepreneurial person" involves the development of skills, attributes, behavioral and motivational capacities that can be used in any context such as in the knowledge economy and "entrepreneurial mindset" is developed. The entrepreneurial mindset enables the university

autonomy, opportunity identification, intuitive, decision making, strategic thinking, initiative taking, networking, creative problem solving, and self-efficacy.

The concept of "being your own boss," and the student's ability to work in an unpredictable external environment which can be achieved by associating entrepreneurial skills which involve, communicating, thinking, feeling, learning, and organizing. Clark (2004; 1998) cited by Armel and Shizhou, (2022) proposes two emerging concepts: "self-reliance" and "the innovative University" as major conceptual frameworks on which the university should focus in its path to entrepreneurialism.

ICT Access

In a study carried by (Kunwar, 2020) on the impact of ICT in adopting online education in Higher Education in Nepal, findings reveal that the development and implementation of different plans and policies concerning ICT in education from school to university level has been introduced. The use of ICT in education has been improved in terms of infrastructure, skill and content. Thus, the utilisation of ICT in education is enforcing teachers as well as educational institutions to review pedagogical practices. Irrespective of this, the issue of the use of ICT has call for concern in the educational system; and this equally includes issues related to equality in access to education and the delivery of quality education including ICTs in education for the learner due to the lack of policy provisions, infrastructure and competencies of the teacher and the student.

In the Nepalese context regarding online education, some questions are critically related to the access of quality internet for each learner and the skillful human resource to handle the ICT. Proper knowledge and skill about operating and implementing ICT in education are essential for effective knowledge transformation; otherwise such new technologies should not be imposed without enabling the teachers and students to comprehend these fundamental shifts Odero, (2017) stated by Kunwar, (2020).

Therefore, Inequalities in access due to lack of physical infrastructure and resources, is reinforcing social inequalities and disturbing the access to higher education Devkota, and Raj , (2021). Kunwar, (2020) states that, ICT master plan should aim to enhance equal and equitable access for quality education by improving the service delivery system and increasing digital devices in education. Thus, technology can help to learn more beyond the classroom and take advantage of

learning opportunities available in museums, libraries, and other out-of-school settings Darling-Hammond & others, (2020) cited by Kunwar, (2020).

Thus, ICT-friendly training and essential ICT tools for each teacher are necessary for effective classroom delivery. Successful implementation of ICT in education depends on the skillful integration of ICT services. Integration of ICT in education, technology-based teaching and learning that closely relates to the utilisation of learning technologies and the integration to improve and increase the quality, accessibility and cost-efficiency of the delivery Ghavifekr and Rosdy (2015)

The role of Information and Communication Technology (ICT) in expanding access to education and professionalising university studies in Cameroon has been extensively studied. The government's focus on digital education is part of its broader efforts to modernise the higher education system. According to Mbangwana (2008), the Cameroonian government has introduced policies aimed at integrating ICT into education as a means to increase access and enhance learning outcomes. These efforts include establishing digital libraries, providing internet facilities, and promoting e-learning platforms.

However, access to ICT in Cameroonian universities is uneven, with significant disparities between urban and rural institutions. Ndongfack (2015) argues that while some universities, particularly those in major cities, have embraced digital technologies, many institutions in rural areas struggle with limited infrastructure, a lack of reliable internet, and outdated equipment. These disparities create a digital divide, which limits the potential of ICT to fully enhance educational access across the country.

In their study, Maguatcher Jeremie and Ning Ru (2020) explore the various dimensions of digital transformation in Cameroon's higher education sector, analyzing the current state, challenges, and opportunities presented by digital technologies. Their work builds on existing literature that emphasizes the importance of adopting digital solutions to enhance educational quality and access. The higher education system in Cameroon faces numerous challenges, including overcrowded institutions, limited resources, and a lack of technological infrastructure. According to Tchombe (2014), these issues hinder the quality of education provided, leading to a mismatch between graduates' skills and labor market demands. This context sets the stage for the need for digital transformation, which can provide alternative pathways for improving educational delivery.

In this context, Maguatcher and Ning Ru (2020) argue that digital transformation can address systemic challenges in Cameroonian higher education. They highlight that digital tools, such as e-learning platforms and online resources, can help overcome geographical barriers and enhance access for students, particularly in rural areas. They identify several key drivers of digital transformation in Cameroon's higher education landscape:

Government Policies: The Cameroonian government has made efforts to promote digital education through policies aimed at enhancing ICT infrastructure in universities. The National Development Strategy 2020-2030 highlights the importance of integrating digital technologies into the education system to improve access and quality. **Globalisation:** The globalisation of education has increased competition among universities, prompting them to adopt digital solutions to meet international standards. This trend is supported by Fonkeng (2016), who emphasises that globalisation necessitates the integration of ICT to remain relevant and competitive.

The Impact of Coronavirus Disease 2019 (COVID-19): The Coronavirus Disease 2019 (COVID-19) pandemic served as a catalyst for the digital transformation of education worldwide. Maguatcher and Ning Ru, (2020) note that the abrupt shift to online learning during the pandemic highlighted the need for robust digital infrastructures in universities. It also revealed the disparities in access to technology and resources among students. Despite the potential benefits, Maguatcher and Ning Ru, (2020) highlight significant challenges facing the digital transformation of higher education in Cameroon:

Infrastructure Limitations: Limited internet access and inadequate technological infrastructure are major barriers to effective digital transformation. As noted by Bassey and Fonkeng, (2015), many institutions struggle with unreliable internet connectivity and outdated computer facilities, which hinder the adoption of digital tools.

Digital Literacy: The lack of digital literacy among both students and faculty poses another challenge. Ndongfack, (2015) emphasizes that without adequate training in using digital technologies, the potential benefits of digital transformation cannot be fully realized.

Financial Constraints: Many universities in Cameroon face financial challenges that restrict their ability to invest in digital technologies and infrastructure. Tambo, (2012) points out that funding limitations can impede the development of e-learning platforms and the acquisition of necessary

technological resources. Maguatcher and Ning Ru, (2020) also discuss the opportunities presented by digital transformation in higher education. They suggest that successful implementation of digital tools can lead to improved educational outcomes, enhanced collaboration, and increased employability of graduates.

Innovative Teaching Methods: Digital transformation enables the adoption of innovative teaching methods, such as blended learning and flipped classrooms, which can enhance student engagement and learning outcomes. Ako and Tambo, (2017) support this notion, indicating that diverse pedagogical approaches enabled by technology can lead to better educational experiences.

Collaboration and Partnerships: Building partnerships with the private sector and international institutions can facilitate knowledge sharing and resource mobilisation, enhancing the digital transformation process. Fonkeng, (2016) suggests that such collaborations can provide universities with access to cutting-edge technologies and expertise.

Maguatcher Jeremie and Ning Ru, (2020) provide a comprehensive overview of the current state of digital transformation in higher education in Cameroon, outlining the challenges and opportunities associated with this process. Their work contributes to the growing body of literature that emphasizes the necessity of integrating digital technologies into higher education to improve access, quality, and relevance in an increasingly competitive and globalized environment.

Selwyn, (2007) emphasizes that ICTs also facilitate collaboration among students and between students and instructors, promoting a more dynamic learning environment. Moreover, Laurillard, (2012) highlights that technologies such as virtual learning environments (VLEs), e-learning platforms, and mobile apps provide students with a range of digital resources, making education more flexible and accessible, especially in developing countries. In the context of African higher education, Chiligo et al. (2016) found that ICTs offer opportunities for overcoming geographical and resource-related barriers. However, they also noted that these benefits are often tempered by challenges such as limited infrastructure, poor internet connectivity, and lack of ICT literacy among both students and faculty.

Several studies have demonstrated the positive impact of ICTs on student learning outcomes. Becta, (2004) reported that students who had access to ICT resources showed improved academic performance compared to their peers who did not use technology in learning. This improvement

was attributed to the availability of a wider range of educational materials, more personalized learning experiences, and increased student engagement in the learning process.

In addition, Higgins, Xiao, and Katsipataki, (2012) conducted a meta-analysis that revealed significant gains in student learning when ICT was integrated effectively into classroom instruction. They found that students who used technology-enhanced learning methods performed better in subjects like mathematics and science, where interactive tools such as simulations and educational software allowed for more engaging learning experiences. At the University of Buea, Ebongue, (2018) explored the use of ICTs in the Faculty of Social and Management Sciences and found that students who utilized online learning platforms and digital resources, such as Moodle, demonstrated higher levels of academic achievement. The study concluded that ICT integration helped bridge gaps in access to educational resources, enabling students to perform better in their assessments and coursework.

ICTs not only improve academic performance but also foster greater student engagement in the learning process. Mayer, (2009) argues that interactive learning environments created by ICT tools, such as video lectures, discussion forums, and digital assessments, enhance student participation and motivation. Students are more likely to engage with course content when they can access a variety of media, collaborate with their peers online, and receive immediate feedback on their work. Tondeur et al. (2013) found that the use of ICTs in higher education encouraged active learning, which promoted deeper understanding and critical thinking skills.

Their study demonstrated that students who participated in ICT-enabled learning activities, such as group projects, online quizzes, and virtual simulations, were more engaged and performed better than students in traditional learning settings.

At the University of Buea, Komnkan, (2020) observed that students who used ICT tools regularly were more engaged in their studies, participated more actively in online discussions, and completed assignments more efficiently. The study also found that students appreciated the flexibility offered by ICTs, particularly those who had other commitments, such as part-time jobs or family responsibilities.

Despite the benefits of ICTs in education, numerous studies have highlighted the challenges faced by universities in developing countries like Cameroon. Unwin et al. (2010) identified several

obstacles to ICT integration in African universities, including inadequate infrastructure, high costs of digital devices and internet access, and limited ICT literacy among students and faculty. These challenges often hinder the effective use of technology in learning, resulting in suboptimal outcomes.

In Cameroon, Ngafor (2017) noted that universities, including the University of Buea, faced difficulties in maintaining reliable internet access and providing students with the necessary digital resources to fully participate in online learning. The lack of sufficient computers in university libraries and computer labs further limited students' ability to take advantage of ICT tools. Additionally, many faculty members lacked the training required to effectively integrate ICT into their teaching practices.

Mbangwana (2008) also highlighted that, although Cameroonian universities had made efforts to adopt ICTs, the digital divide between urban and rural students was still a significant issue. Students from rural areas, who often lacked access to reliable internet and digital devices, were at a disadvantage compared to their peers in urban centres. This inequality was exacerbated by the high cost of mobile data, which restricted many students' ability to access online learning platforms.

To address the challenges associated with ICT adoption in higher education, several studies have proposed solutions aimed at improving infrastructure, training, and access to digital resources. Evoh, (2007) suggests that governments and educational institutions should invest in improving internet connectivity, particularly in rural areas, and subsidize the cost of digital devices to make them more affordable for students. Mtebe and Raisamo, (2014) argue that universities should provide ongoing professional development for faculty to ensure that they are equipped with the necessary skills to integrate ICT into their teaching. They also recommend that institutions create more robust digital infrastructures, such as Wi-Fi networks and computer labs, to support the growing demand for online learning.

At the University of Buea, Komnkan, (2020) recommends that the institution increase its investment in ICT infrastructure, provide more training opportunities for faculty, and work with telecommunication companies to offer affordable internet packages for students. These measures would help to bridge the digital divide and enhance the overall effectiveness of ICTs in improving student learning outcomes.

Case studies from other universities in Africa provide insights into successful ICT implementation strategies. Farrell and Isaacs, (2007) describe a successful ICT initiative at Makerere University in Uganda, where the institution partnered with private companies to provide affordable laptops and internet access to students. The initiative also included extensive faculty training and the development of digital course materials, leading to improved student performance and engagement. Similarly, Mutula, (2008) discusses the University of Botswana's ICT strategy, which focused on expanding digital infrastructure, increasing access to online resources, and providing continuous support to both students and faculty. The success of the program was attributed to the institution's commitment to addressing both technical and human resource challenges.

The effectiveness of ICTs on student learning in the University of Buea is supported by extensive literature showing that technology can enhance academic performance, student engagement, and learning outcomes. However, challenges such as limited infrastructure, the digital divide, and inadequate training continue to hinder the full potential of ICTs in Cameroonian higher education. Addressing these challenges through targeted investments in technology, professional development, and affordable access to digital resources will be key to ensuring that students at the University of Buea, and other institutions in Cameroon, can fully benefit from the opportunities that ICTs provide.

The digitalisation of educational content in higher education has become a global trend, driven by the need for accessibility, flexibility, and the integration of technology into the learning process. In Cameroon, the push toward digital learning content is part of a broader initiative to modernize higher education and align it with global standards. Charles Ngiewih Teke's work explores the challenges and opportunities of digitalizing a Critical Theory course at the University of Yaoundé examining the implications for pedagogy, access, and the professionalisation of academic programs.

Critical Theory, rooted in the works of scholars like Theodor Adorno, Max Horkheimer, and Jürgen Habermas, emphasizes the need for education to challenge dominant ideologies and empower individuals to think critically about societal structures. Giroux, (1983) argues that education should be an emancipatory process that equips students with the tools to critique and transform their social realities. Integrating Critical Theory into higher education curricula is thus

aimed at fostering intellectual independence, critical thinking, and social awareness among students.

In the context of Cameroon's higher education system, the inclusion of Critical Theory courses highlights the importance of creating a more informed and engaged citizenry. However, the traditional, lecture-based approach to teaching such complex theoretical content has limitations, which digitalisation could address by enhancing student engagement and access to diverse learning materials. The integration of Information and Communication Technology (ICT) into education has revolutionized the way learning content is delivered and consumed. UNESCO, (2011) emphasizes that digital technologies can bridge geographical, economic, and social divides by enabling access to educational resources for students in remote or underserved areas. In Cameroon, the Ministry of Higher Education has recognized the potential of ICT in improving education quality and has initiated policies aimed at promoting digital learning.

Tambo, (2012) notes that the introduction of ICT in Cameroon's higher education system, including digitalizing content, aligns with the country's broader goals of professionalizing education and preparing graduates for a technologically driven job market. However, the successful integration of digital content in higher education requires substantial infrastructure, teacher training, and the adaptation of existing curricula to fit digital platforms.

Availability of ICT trained lecturers

In a study carried by Kunwar, Poudel, and Shrestha, (2020) on online education and its major issues and challenges in higher education in Nepal, the classes of the bachelor's programs of different universities were found running rather less effectively. The overview issues and challenges that occur during the delivery of the online courses situated amongst the students, teachers and the curriculum are coursed by technology, students' guidance and support, equity, pedagogy, access, time and attitude.

The technical assistance or support in the classroom to utilize the resources related to ICT is a major problem that is affecting the integration of ICT in teaching. Technical problems are also the barriers for teachers in the Nepalese context that have created problems in the smooth delivery of class in natural flow. However, to underpin online learning, ICT and educational technology in online education should be used properly

The professionalisation of higher education has emerged as a critical focus for universities worldwide, particularly in the context of aligning educational outcomes with labor market needs. In Cameroon, the interplay between the professionalisation of higher education and the employability of graduates in state universities has garnered significant attention. Nyenty Stephen Atem, (2021) examines this relationship, highlighting the challenges and opportunities within the Cameroonian higher education landscape. He situates his research within the broader framework of educational reform and employability. He defines professionalisation as the process through which higher education institutions align their curricula, teaching methodologies, and skill development initiatives with the demands of the labor market. This alignment is essential for enhancing graduates' employability, which is defined as the ability of graduates to secure and maintain employment relevant to their field of study.

The importance of this concept is underscored by Hillage and Pollard, (1998), who emphasize that employability is influenced not only by the education and skills acquired but also by the ability to demonstrate these competencies effectively to potential employers. The Cameroonian higher education system has undergone various reforms aimed at improving its quality and relevance. Tambo (2012) notes that the introduction of the License-Master-Doctorate (LMD) system aimed to modernize curricula and enhance the employability of graduates. However, the effectiveness of these reforms remains contested, with critiques focusing on the quality of education and the readiness of graduates for the job market.

Atem, (2021) emphasizes that while reforms have been implemented, significant challenges persist, including outdated curricula, insufficient practical training, and a lack of collaboration between universities and industries. Fonkeng, (2022) supports this view, arguing that many state universities in Cameroon continue to operate in silos, limiting their responsiveness to the needs of the labor market.

A key theme in Atem, (2021) work is the role of curriculum design in professionalizing higher education. He asserts that curricula must be revised to include practical skills, critical thinking, and industry-relevant competencies. Mbangwana, (2008) emphasizes that traditional, theoretical approaches to education are insufficient for preparing graduates for the complexities of modern work environments. In this context, Ndongfack, (2015) highlights the need for universities to incorporate internship programs, industry partnerships, and experiential learning opportunities into

their curricula. Such initiatives can enhance students' hands-on experience and better equip them for the job market. Atem, (2021) identifies several barriers to graduate employability in Cameroon, including:

Mismatched Skills: There is often a gap between the skills acquired during university education and those required by employers. Tchombe, (2014) notes that many graduates struggle to demonstrate the practical competencies sought by employers, leading to high unemployment rates among educated youth.

Limited Industry Engagement: The lack of collaboration between higher education institutions and industries hampers the development of relevant educational programs. Bassey and Fonkeng, (2015) point out that effective partnerships can provide universities with insights into labor market demands, enabling them to adapt their curricula accordingly.

Economic Factors: The broader economic context also impacts employability, with high levels of unemployment and underemployment in Cameroon. Ako and Tambo, (2017) emphasize that economic conditions significantly affect graduates' ability to secure jobs, regardless of their qualifications. Atem, (2021) advocates for comprehensive policy reforms aimed at enhancing the professionalisation of higher education in Cameroon. Key recommendations include:

Curricular Reform: Updating curricula to focus on skills development, practical training, and industry needs. This aligns with the recommendations of Hillage and Pollard, (1998), who advocate for a skills-oriented approach to education.

Strengthening Partnerships: Fostering collaborations between universities and industries to create internship opportunities, mentorship programs, and joint research initiatives. This would enhance the relevance of educational programs and facilitate smoother transitions from education to employment.

Investment in Faculty Development: Providing training and professional development for educators to enhance their teaching methodologies and ensure they are equipped to deliver industry-relevant education.

In conclusion, Nyenty, Stephen and Atem (2021) research underscores the critical need for the professionalisation of higher education in Cameroon as a means to enhance graduates'

employability. While significant challenges exist, targeted reforms in curriculum design, industry engagement, and policy implementation can pave the way for a more responsive higher education system that meets the evolving demands of the labor market. This study contributes to the broader discourse on education reform and employability, offering valuable insights for policymakers, educators, and stakeholders in the Cameroonian higher education sector.

The Coronavirus Disease 2019 (COVID-19) pandemic significantly impacted the education sector worldwide, forcing institutions to adopt technological solutions to ensure the continuity of learning. In developing countries like Cameroon, universities had to rapidly integrate technology into their educational systems. Endurance Midinette Koumassol Dissake's study on the University of Bamenda explores the challenges and opportunities that emerged as the institution transitioned to remote learning. This review examines related studies on the introduction of technology in education during the pandemic, focusing on themes such as access to digital tools, pedagogical adaptations, and the constraints faced by students and faculty.

The global shift to online learning due to the pandemic was unprecedented, as educational institutions were compelled to adopt digital platforms to deliver instruction remotely. Dhawan (2020) highlights that the pandemic accelerated the adoption of technology in education, making online platforms, e-learning resources, and digital collaboration tools indispensable in maintaining academic continuity.

Similarly, Czerniewicz et al. (2020) argue that, the rapid deployment of educational technology exposed the digital divide between well-resourced institutions and those with limited access to technology. This divide was particularly evident in developing countries, where internet connectivity and access to devices were major barriers to effective online learning. Studies on Africa's higher education systems, such as Adeoye, Adanikin, and Adanikin, (2020), point out that although many universities adopted digital platforms, the lack of infrastructure and preparedness hindered a smooth transition to online education.

Before the pandemic, Cameroon's higher education system had already begun incorporating some aspects of ICT into teaching and administration. However, the pace of digital transformation was slow, particularly in state universities such as the University of Bamenda. Fonkeng and Fingesi,

(2017) noted that although ICT had been identified as a critical tool for modernizing education in Cameroon, the actual implementation remained limited due to financial constraints, lack of infrastructure, and inadequate training for faculty members.

The outbreak of 2019 (COVID-19) forced institutions like the University of Bamenda to adopt online learning with limited preparation, which led to several challenges. Mendo, (2021) notes that the rapid shift exposed gaps in digital literacy among faculty and students, as well as inadequate access to reliable internet services, particularly in rural areas where many students resided.

One of the major challenges highlighted in the literature on the pandemic and education is unequal access to technology. UNESCO, (2020) reports that in sub-Saharan Africa, many students lacked access to the necessary devices and internet connectivity to participate in online classes. Mochama and Muchiri, (2021) found that only a minority of students in countries like Kenya and Cameroon had access to personal laptops or reliable internet connections, making it difficult for them to engage fully in online learning during the pandemic.

At the University of Bamenda, Ngangoum (2021) observed similar challenges, where a significant number of students faced difficulties accessing online learning platforms due to poor internet infrastructure and lack of affordable data services. Furthermore, the rural-urban divide exacerbated these challenges, with students in rural areas experiencing more frequent disruptions in their internet access compared to those in urban centers.

The shift to online education during the pandemic required universities to adapt their pedagogical approaches to suit digital platforms. Bao, (2020) suggests that effective online learning requires more than just a transition of traditional content to digital platforms; it demands a rethinking of pedagogical strategies to engage students through multimedia tools, discussion forums, and interactive assignments. However, not all universities were equipped with the resources or expertise to make these changes.

At the University of Bamenda, Tandzi and Angu ,(2021) reported that the use of e-learning platforms like Moodle and Google Classroom was introduced hastily, and many faculty members lacked the training to use these tools effectively. This led to uneven levels of engagement across courses, with some professors resorting to distributing notes via WhatsApp due to the simplicity

and accessibility of the platform. Ngouabe, (2021) also emphasized the importance of capacity building for educators, noting that a significant portion of university instructors in Cameroon were unfamiliar with online teaching methods.

The literature reveals multiple constraints faced by both students and faculty in adapting to the new technological environment during the pandemic. Adedoyin and Soykan, (2020) identified the lack of technical support, inadequate digital infrastructure, and poor internet connectivity as the primary obstacles to effective online learning in developing countries. For students, the financial burden of purchasing data packages and electronic devices further compounded these challenges.

Similarly, at the University of Bamenda Fomba, (2021) reported that many students were unable to keep up with online classes due to connectivity issues and the lack of personal computers. Some relied on public internet cafes, which were either inaccessible during lockdowns or located far from their homes. Additionally, Ngassa (2020) found that faculty members, especially older professors, struggled with the digital tools, which affected the quality of instruction delivered during the transition to online learning.

Several studies have emphasized the need to address the digital divide to ensure equitable access to education. World Bank, (2021) suggests that governments and educational institutions must invest in infrastructure, provide affordable internet access, and implement digital literacy programs to enable students and faculty to navigate the digital landscape effectively.

In the case of the University of Bamenda, Mendo, (2021) suggests that long-term investment in ICT infrastructure, particularly in providing affordable internet services to students, would be crucial in overcoming the challenges exposed during the pandemic. Furthermore, Ngangoum, (2021) recommends the establishment of continuous professional development programs for faculty to enhance their digital teaching skills and improve the overall quality of online education.

Case studies from other African universities offer valuable lessons for institutions like the University of Bamenda. Chitanana, Makaza, and Madzima, (2008) discuss Zimbabwe's experience with e-learning, where universities faced similar challenges during the transition to online education but managed to sustain learning through partnerships with private telecommunication companies that provided students with subsidized data. Ssekakubo, Suleman, and Marsden, (2011) also explore Uganda's Makerere University, which had adopted a blended

learning model even before the pandemic, demonstrating the benefits of proactive investments in ICT infrastructure and faculty training.

The review of related studies reveals that the introduction of technology in education during the pandemic was met with varying degrees of success, particularly in developing countries like Cameroon. At the University of Bamenda, the sudden shift to online learning exposed significant challenges, including poor access to technology, a lack of digital literacy, and inadequate infrastructure. To improve the integration of technology in higher education, there is a need for long-term investments in digital infrastructure, comprehensive training programs for faculty, and efforts to bridge the digital divide among students. The experience of other African universities suggests that partnerships between government, educational institutions, and private companies can provide the necessary resources to support the digital transformation of education.

Quality technology support in education is crucial for the successful integration of technology in teaching and learning. As schools, colleges, and universities increasingly adopt digital tools, the role of technology support becomes more prominent. Effective support ensures that educators and students can utilize digital resources seamlessly, thereby enhancing the overall educational experience. The questions of what constitutes quality technology support, who has access to it, and its impact on educational outcomes have been central to discussions in the field of educational technology.

Quality technology support is multifaceted and includes technical assistance, professional development, infrastructure maintenance, and troubleshooting. Kozma, (2005) defines technology support as the provision of adequate resources, training, and troubleshooting for educators and students to use technology effectively in educational settings. According to Ertmer and Ottenbreit-Leftwich, (2010), high-quality support goes beyond solving technical problems; it involves empowering teachers and students to use technology to enhance learning experiences. In their research on technology adoption in education, Selwyn (2008) highlights that quality support includes both hardware and software assistance, ensuring that educational technology tools are accessible, functional, and integrated into curriculum design. Furthermore, it involves providing ongoing professional development to help teachers incorporate technology into their pedagogy, adapting to new tools and platforms as they evolve.

Access to quality technology support is not evenly distributed across educational institutions. Studies by Dexter et al. (2002); Bebell and O'Dwyer (2010) suggest that schools with more financial resources, particularly those in urban areas, tend to have better technology infrastructure and support systems than rural or underfunded schools. In wealthier institutions, dedicated IT teams are often available to troubleshoot issues, provide training, and ensure the smooth operation of digital tools.

However, Warschauer and Matuchniak (2010) found that schools in disadvantaged areas often struggle to provide adequate technology support. The digital divide—both in terms of access to technology and the availability of quality support—means that schools in low-income communities face significant challenges in using technology effectively. These institutions may have outdated equipment, limited bandwidth, or insufficient personnel to provide the necessary support for teachers and students. Hohlfeld et al. (2008) add that in many underfunded schools, technology support is often relegated to teachers who lack the specialised training required to maintain and troubleshoot equipment, further exacerbating inequities in access.

The professionalisation of University studies

In a study carried by Atem (2023) centered on the professionalisation of Higher Education and graduates' employability in State Universities in Cameroon, graduates' professionalisation is determined by the curriculum content of programmes and infrastructural resources,. It is determined that, the infrastructural resources are inadequate and the curriculum not professionally oriented. University programs are to be designed to match adequate educational infrastructure and relevant human resource to enable the professionalisation of students Mavrino and Mingaleva, (2017).

Whereas in Cameroon, Higher Education system is suffering from not only inadequacy in teaching programs, but also outdated infrastructural resources, unmatched funding and deficiency in teacher's quality the Sector Wide Approach, (2006). It follows that, the prime goals of the University reforms of 1993 were the decongestion of the University of Yaoundé and the professionalisation of University studies to train graduates relevant to the private sector and the needs of the country as a whole. And responsive to the needs of the job market, and also enable graduates to find employment in the private sector and be self-employed.

Atem (2023) recommends that adequate measures should be implemented to improve curriculum contents and infrastructural resources for effective professionalisation of programmes in State Universities to enhance graduates' acquisition of employability skills while internships, practicum and field work are intensified. Nevertheless, he did not take into consideration that students have personal available technologies but need the essential knowledge on digitalised research skills.

In a study investigating the level of professionalisation in universities relevant to addressing graduate employability and readiness for the job market by Bilola and Doh (2016) revealed that professionalisation for graduate employability in Cameroon's higher education is viewed as old wine in new wineskins. This is because Higher Education has adopted modern practices from the exterior but retains the old core. This implies that the higher education programs are not producing graduates with the kind of professional skills which they need to be successful in their careers De la Harpe, et al, 2000). This means, universities are not producing graduates with the kind of professional skills which they need to be successful in their careers.

To resolve the problem in relation to the advances of digital technology and globalisation, digital literacy has a more important role. There is a need for continuous updates in education. At the policy level, they need to address the problem of the absence of clearly defined career development profiles for academic and support staff

Staff, widespread teaching overloads under poor working conditions, lack of clear-cut, lack of research facilities and inadequate space adapted for research.

In a study by (Wei, 2022), to successfully use digital tools in education and in work, digital literacy education should be treated as a continuous process applied from kindergarten to university. This work focuses on digital literacy in the local scope, referring to basic skills applied in local life, and the global scope applied to the active role of learners in global education issues, stable connections with other participants globally and relations to other literacies like policy and transnational literacy.

As such, the professionalisation of education starts with the digitalisation of education with the ability to search, evaluate, and compose information and do tasks through digital equipment and the internet in study, work and social life, Kady and Vadeboncoeur (2019). It follows that, Students learn to solve academic questions with the help of digital devices; they also benefit from using

digital equipment and social media. Using technology at home, such as social networks, with proper guidance, improves student engagement, cognitive skills and academic performance Park, Y. (2019).

The three skill sets of global digital literacy include: information, media, and technology; learning and innovation skills; and life and career skills Warschauer, M., & Matuchniak, T. (2010), but higher education in Cameroon has scarcely considered this aspect.

Again, stakeholders in education are to build connections and get. A framework with six branches, professional engagement, digital sources resources, teaching and learning, assessment, empowering learners & facilitating learners' digital competence should be promoted to address education issues and to promote the development of digital literacy in global context Tejedor, Cervi, Pérez-Escoda, and Jumbo, (2020). Global digital literacy promotes prosperity, strengthen democracy, expand educational opportunity and lift some of the world's poorest and most vulnerable areas out of poverty. It offers access to digital economy, connecting people from developing world with the most successful communities.

Developing digital tools will consequently improve Cameroon's education softpower by making schools and graduates more competitive in global labor market Delacruz, S. (2019).

Theoretical framework

This section explores the theoretical framework of the study. Here, three main theories are convoked to explain the phenomenon.

Actor-Network Theory (ANT)

The professionalisation of university studies in the digital age is closely tied to the integration of Information and Communication Technologies (ICTs) within higher education institutions. Information and Communication Technologies (ICT) infrastructure plays a key role in modernizing and professionalizing educational systems, providing students and educators with tools that support skill acquisition, knowledge dissemination, and the creation of professional networks. To understand the dynamics behind the professionalisation of university studies through Information and Communication Technologies (ICT) infrastructure, Actor-Network Theory (ANT) offers a useful theoretical framework. Actor-Network Theory (ANT), developed by Bruno Latour, Michel Callon, and John Law, is centered on understanding how both human and non-

human actors (like technology) interact to create networks that shape society, knowledge, and practices.

This section will explore how Actor-Network Theory (ANT) provides a conceptual basis for examining the relationship between Information and Communication Technologies (ICT) infrastructure and the professionalisation of university studies, focusing on the interactions between human actors (e.g., students, educators, administrators) and non-human actors (e.g., ICT platforms, digital tools, physical infrastructure) within academic settings.

Overview of Actor-Network Theory (ANT)

Actor-Network Theory (ANT) is a sociological framework that examines how networks of relationships between both human and non-human entities form and evolve to produce outcomes. Unlike traditional social theories that focus primarily on human actors, Actor-Network Theory (ANT) treats non-human entities (e.g., technologies, objects, texts) as “actors” with the ability to shape the structure and dynamics of a network. Actor-Network Theory (ANT) views society, organisations, and knowledge systems as constantly evolving networks, where stability is maintained through the interactions between these actors.

Key concepts within Actor-Network Theory (ANT) include:

Actors: Entities that influence or are influenced within the network, including both human agents (students, teachers) and non-human agents (ICT tools, software, infrastructure).

Translation: The process by which actors align their interests and goals, negotiating their roles within the network.

Network Formation: The interactions that lead to the creation and stabilisation of networks, which are the result of complex negotiations between various actors.

In the context of higher education, Actor-Network Theory (ANT) can help explain how Information and Communication Technologies (ICT) infrastructure (a non-human actor) interacts with human actors (students, educators, administrators) to professionalise university studies. The alignment of interests and goals among these actors can enhance learning experiences and improve professional outcomes for students.

In the context of university studies, the network of interactions between Information and Communication Technologies (ICT) infrastructure and human actors (students, educators) determines the effectiveness of professionalisation efforts. Actor-Network Theory (ANT) helps us analyse how these interactions take place and how they contribute to the overall professional development of students.

Students and Information and Communication Technologies (ICT) Tools: From an Actor-Network Theory (ANT) perspective, students interact with Information and Communication Technologies (ICT) tools not simply as passive recipients but as active participants who negotiate their learning experiences. For example, students using online learning platforms may customise their study plans, select specific digital resources, and engage in collaborative work with peers, all of which contribute to their professional readiness.

Educators as Mediators: Educators, another critical actor in the network, guide and mediate the relationship between students and Information and Communication Technologies (ICT) infrastructure. They are responsible for aligning the use of technology with pedagogical goals and ensuring that students are acquiring relevant skills for their professional careers. Actor-Network Theory (ANT) highlights the active role educator's play in "translating" technology into practical learning experiences.

Information and Communication Technologies (ICT) Platforms and Curriculum Design: Information and Communication Technologies (ICT) platforms act as non-human actors that influence how university curricula are designed and delivered. For example, learning management systems (LMS) can dictate the structure of course content, while digital tools may determine the types of assessments students encounter. The alignment of curriculum design with professional industry standards is a crucial element in the professionalisation of university studies, and Information and Communication Technologies (ICT) platforms play a central role in this alignment.

Implications of the Actor-Network theory for the present study

Actor-Network Theory provides a powerful framework for understanding the role of Information and Communication Technologies (ICT) infrastructure in the professionalisation of university studies. By examining the interactions between human and non-human actors, Actor-Network Theory (ANT) helps explain how digital tools and platforms contribute to the preparation of

students for professional careers. When ICT infrastructure aligns with the goals of educators, students, and administrators, the network becomes stable, and professionalisation efforts are successful. However, challenges such as infrastructure gaps, the digital divide, and resistance to technology can destabilise the network, highlighting the need for targeted interventions to support ICT integration in higher education.

Social Capital Theory

In today's higher education landscape, Information and Communication Technology (ICT) access is pivotal for student learning, academic success, and professional growth. However, unequal access to ICT resources can deepen social inequities, leaving certain groups disadvantaged. Social Capital Theory (SCT), developed by scholars like Pierre Bourdieu, James Coleman, and Robert Putnam, offers a useful lens to explore how social relationships and networks affect ICT access and equity in education. SCT highlights how students' access to ICT is influenced by their social connections, resources, and networks, which in turn affect their academic and professional success.

This review will examine how SCT helps understand the complex relationship between ICT access and equity in higher education, emphasizing how social capital can either facilitate or hinder students' engagement with technology.

Social Capital Theory refers to the resources and benefits derived from social relationships and networks that individuals can access for personal or collective goals. According to SCT, social capital is classified into three forms:

Bonding Social Capital: Refers to strong connections within tight-knit groups like family, close friends, and communities, providing emotional and material support.

Bridging Social Capital: Involves weaker ties that connect individuals to broader networks, offering access to new information, opportunities, and diverse perspectives.

Linking Social Capital: Connects individuals with institutions or authorities, providing access to resources like formal education, mentorship, or employment opportunities.

In the context of ICT access in higher education, social capital impacts students' ability to access and utilise technology effectively. Students with higher levels of social capital can tap into

resources that enhance their digital skills and academic performance, while those with limited social capital may face barriers to ICT access and digital inclusion.

ICT Access and Equity in Higher Education

The digital divide in higher education is a pressing issue, especially as technology becomes increasingly integrated into learning environments. ICT access in education includes access to digital devices, internet connectivity, e-learning platforms, and technical support. However, access to these resources is not distributed equally among students. Factors like socioeconomic status, geographic location, institutional resources, and personal networks all play significant roles in shaping students' access to ICTs.

Equity in ICT access refers to ensuring that all students, regardless of their background, have the opportunity to engage with technology in ways that support their learning and career development. However, disparities in access create a digital divide where marginalized students may lack the devices, digital literacy, and internet connectivity needed to fully participate in their education.

Implications for Policy and Practice

To address inequities in ICT access and promote digital inclusion in higher education, universities and policymakers should consider strategies that enhance students' social capital. By fostering supportive networks and creating inclusive environments, institutions can help bridge the digital divide and ensure that all students have the opportunity to succeed in the digital age. Key strategies include:

Expanding digital infrastructure: Universities should invest in expanding ICT infrastructure, ensuring that all students have access to the necessary devices, internet, and software. Providing free or low-cost access to laptops, Wi-Fi hotspots, and e-learning platforms can significantly reduce inequities.

Promoting peer mentorship and collaboration: Fostering peer networks that encourage knowledge sharing and collaboration can help students build bridging social capital, improving their digital literacy and access to technology. Institutions can facilitate this by creating online communities, peer support programs, and study groups.

Enhancing institutional support: Strengthening linking social capital by improving communication about available ICT resources and support services is essential. Universities should ensure that students are aware of technological support, financial aid for technology purchases, and digital training opportunities.

Social Capital Theory provides a valuable framework for understanding the relationship between ICT access and equity in higher education. By examining how students' social networks influence their ability to access and use ICTs, SCT highlights the importance of addressing social and institutional factors that contribute to digital inclusion or exclusion. Efforts to enhance bonding, bridging, and linking social capital can help ensure that all students have equal opportunities to succeed in a technology-driven academic environment, ultimately promoting greater equity in higher education.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Davis (1989), is one of the most widely recognized models for understanding user acceptance of technology. TAM helps explain how individuals come to accept and use new technologies based on two primary factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). In the context of higher education, especially concerning the professionalisation of university studies, TAM plays a significant role in understanding how students and faculty adopt and utilize ICT tools for academic and professional purposes. Additionally, the availability of ICT technical support can significantly affect the successful implementation and integration of technology in the educational process.

TAM is grounded in Fishbein and Ajzen's Theory of Reasoned Action (TRA) and suggests that individuals' behavioral intentions to use technology are primarily driven by:

Perceived Usefulness (PU): The belief that using a specific technology will improve performance (in this case, academic or professional success).

Perceived Ease of Use (PEOU): The belief that using the technology will be effortless, making the adoption process smoother. These two factors shape the Attitude Toward Using Technology, which in turn influences the Behavioural Intention to Use and actual use of the technology.

TAM and ICT Technical Support

ICT technical support plays a crucial role in facilitating the acceptance and use of technology by students and faculty in higher education. According to TAM, the success of ICT adoption in universities is largely influenced by how useful and easy-to-use users perceive the technology. The presence of reliable technical support can greatly impact both Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) in several ways:

Enhancing Perceived Usefulness (PU): When users have access to effective ICT technical support, they are more likely to believe that the technology will improve their academic or professional performance. For example, technical support ensures that digital tools and platforms operate smoothly, allowing students and faculty to focus on their tasks rather than on troubleshooting issues.

Improving Perceived Ease of Use (PEOU): Technical support assists with installation, troubleshooting, and optimizing the use of ICT tools. When users know that support is available to help them overcome difficulties, they are more likely to perceive the technology as easy to use, increasing their willingness to adopt it.

The Role of TAM in ICT Support for Professionalisation

In the context of professionalising university studies, the integration of ICT tools is essential for preparing students for the workforce. TAM provides a theoretical framework for understanding how the quality of ICT technical support affects students' and educators' attitudes towards using technology for professional development. Several aspects highlight this role:

Support for Professional Software: Many university programs now incorporate professional software (e.g., data analysis tools, design software, coding platforms) to bridge the gap between education and industry. TAM suggests that students will be more willing to use these tools if they perceive them as useful and easy to use. Reliable ICT technical support ensures these tools are accessible, regularly updated, and aligned with industry standards, increasing both PU and PEOU.

Training and Workshops: Effective ICT technical support often includes training sessions and workshops that help users develop digital competencies. By offering these resources, universities

can enhance the ease of use of complex professional tools, which in turn promotes their acceptance among students and faculty.

24/7 Support and Troubleshooting: Universities that provide robust, round-the-clock ICT technical support increase users' confidence in technology. Students are more likely to engage with professional ICT tools if they know help is available whenever they encounter technical problems, thereby improving PEOU.

Feedback Mechanisms: TAM also emphasises the importance of continuous improvement. ICT support teams can collect user feedback on their experiences with the technology and address any pain points, further enhancing the perceived ease of use and overall user satisfaction.

The Technology Acceptance Model (TAM) provides a robust framework for understanding how ICT technical support can facilitate the professionalisation of university studies. By addressing users' Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), effective technical support systems can foster a more technology-friendly environment, allowing students and faculty to adopt ICT tools with greater ease and confidence. This, in turn, enhances the professional relevance of higher education programs, helping to bridge the gap between academic learning and industry requirements.

CHAPTER 3

RESEARCH METHODOLOGY AND PROCEDURES

This chapter outlines the methodologies used in the present study to investigate the effects of ICT integration in higher education on the professionalisation of university studies, with evidence from the Geography Department at the University of Yaoundé I, Cameroon, serving as the case study. The research methodology provides a framework for data collection, analysis, and interpretation, ensuring that the research objectives are systematically achieved (Creswell) 2014.

Research Design

A research design according to Creswell (2014) is the framework of methods and techniques that the researcher has chosen to conduct the research. Research design sets out the procedure for conducting the research. It describes the pathway used by a researcher to solve a problem. Here, a descriptive survey research design was adopted for this study. This design is deemed appropriate for comprehensively evaluating the relationship between ICT policies and the professionalisation of university studies, as it allows for an in-depth understanding of policy content and its practical impact on students and faculty in the Geography department. ICT integration in higher education has become a top priority to educational stakeholders as it is proportionate to the professionalisation of studies and graduates' employability. The descriptive research survey was seen to be the correct design since it allows us to have an in-depth analysis of the integration of ICT in the Geography department and how it affects graduates' employability upon leaving the university premises after graduation.

Research approach

A research approach refers to the method used by a researcher to carry out research. In educational sciences, there are basically three major approaches for carrying out research. This involves the quantitative, qualitative and the mixed research approach. For Creswell (2014), there exists a variety of research approaches. The choice of an approach depends on the personal experience that one has regarding an approach. This implies that the researcher need to be familiar with at least one of the three approaches.

Since this study seeks to investigate the effects of ICT integration and professionalisation of university studies in the University of Yaoundé I, the study adopted a quantitative research approach as the method to conduct the study. The choice of this approach was because of its

numerous advantages. This approach was chosen over the other approaches because it allows the researcher to draw conclusions and declarations in a more objective manner by avoiding all forms of subjectivity and reducing the potentials of results being bias. This approach was also seen to be appropriate for this study because it allow the researcher to carefully verify the research hypotheses and draw meaningful judgments and conclusions. Again, this approach was adopted because of the researcher's willingness to generalize the results of the findings at the end of the study. All these reasons notwithstanding the limitations of the approach accounts for the adoption of the approach in this study.

Research type

It is understood that, a research is a systematic process which aim to discover new knowledge, enrich existing information or theory or solve a problem or an issue affecting the society. There are several different types of research each with its purpose, method and characteristic. The choice of a research type is usually conditioned by the method adopted and the objective pursue by the researcher. The present study adopted a correlational research type. The choice of this research type is because the researcher wishes to establish the causal relationship between the two variables. Since the purpose of the study seeks to investigate the effects of ICT integration on the professionalisation of university studies, with evidence from the University of Yaoundé, this research type proves to be very sufficient.

Area of study

Cameroon is a central African country commonly known as “Africa in miniature”. The country occupies a central role in central Africa as it welcomes students from all the countries of the sub-region. The country has a total of 11 public universities which offer a range of academic programs both to national and non-national students. The universities are spread in the respective 10 regions of the country with the center region having two state-own universities. The University of Yaoundé 1 is the oldest university in Cameroon followed by the University of Yaoundé 2. As of now, the country has 2 universities in the English speaking regions of the country and 9 in the French speaking regions of the country.

The research is conducted in Cameroon, Yaoundé, and Centre region. Specifically, the study is carried out in the Mfoundi division, precisely in Yaoundé III sub-division. The University of Yaoundé 1 constitutes one of the largest public university in the country. The university is made

up of four main faculties (Faculty of Art, Letters and Social sciences, Faculty of Science, Faculty of Medicine and Biomedical sciences and Faculty of Education). Besides the classical faculties, the university also have advanced training schools with most notable being the National Advanced school of Engineering and the higher teachers training college of Yaoundé.

Faculty of arts, letters and social sciences is where the study is conducted. The research is conducted at the Geography Department, University of Yaoundé I, one of the largest public universities in Cameroon. This department has integrated various ICT tools and platforms into its teaching and learning processes, making it an ideal case for assessing the alignment between government ICT policies and higher education professionalisation efforts.

Population of study

According to Creswell (2014), a population of study refers to all the animate and inanimate objects and individuals found in a geographical setting which the researcher intends to observe throughout the research process. In this study, the population comprises of all the individuals in the University of Yaoundé I. this consisted of teachers, students, staff, support staff, and other informants considered important for the study. The population of study was made up of both male and female.

Target Population

The target population is a subset of the total population that shares the same characteristics as the total population, on which the researcher wants to draw inferences. For the present study, the researcher targeted principally students, lecturers, staff, and support staff of the faculty of arts, letters, and social sciences. This was considered as an option since the researcher could not work with all the participants in the university.

Accessible population

This refers to the sub-set of the target population. It generally has the same characteristics as the total population. Onen (2020), the accessible population is the subset of the targeted population from which the researcher has reasonable access and from which the population sample can be drawn. The accessible population forms the basis for selecting the sample size for the study. The accessible population of the study includes individuals who were met by the time the researcher went to the field for data collection. The present study focuses on two key groups within the Department of geography:

Faculty Members: Including professors, lecturers, and administrative staff responsible for implementing ICT in education.

Students: Enrolled in undergraduate and postgraduate Geography programs.

Table 1: Distribution of the Accessible population of the Study

Category of participant	Population		Total
	Male	Female	
Staff	37	49	86
Students	553	396	949
Total	590	445	1035

Source: Fieldwork, 2025

Sample Size and Sampling Techniques

Sampling procedure constitutes an important step in a research. Regardless of the research design, method, approach or type of study, it is always advisable to define the sample size and sampling techniques in a research work. This is because conducting a research is a very tedious and tiring initiative which involves individuals to interview, places to visit and events to observe. Due to a number of constraints including time constraint, it becomes a necessity to define the sample size of a study.

Sample size

This refers to the total number of participants that took part in the study. Based on the accessible population, a sample size was purposefully selected for this study. Amin (2005), states that the sample size of a study is a portion of the total population considered to be representative and having the same characteristics as the entire population. This means that the sample population should be drawn in such a way that it will include all the segments of the studied population. In this sense, a total of 276 participants, both male and female, were selected for the study. These participants were selected thanks to the help of the Supervisor.

Table 2: Distribution of the sample population of the study

Category of participant	Population		Total
	Male	Female	
Staff	18	28	46
Students	125	105	230
Total	143	133	276

Source: field survey, 2025.

The table above presents the distribution of the sample size of the study according to the category of the participants and their gender. It is observed that 46 staff (18 males and 28 females) participated in the study. We also note the sample population is dominated by the students (230), both male and female. This dominance can be explained by the fact that the students constituted the centre of our investigation because they are the ones directly affected by the professionalisation process in universities. Also, this category of participants was easily accessible to the researcher.

Sampling techniques

In research, there are basically two main types of sampling methods. This involves the probability or random sampling method and the non-probability or non-random sampling method. The choice of a sampling method depends on the objective and expected results of the study as well as the researcher's familiarity with a method. In the case of this study, the probability or random sampling method was employed for the selection of participants. This method is specific in that it allows all the participants a chance to be sampled for the study.

The probability sampling method encompasses different sampling techniques believed to be adequate for the selection of participants. Some of these techniques are the simple random sampling, stratified sampling, cluster sampling, and systematic sampling techniques. The study employs the simple random and stratified sampling techniques to select participants who are directly involved in or affected by the use of ICT in the Geography department.

The simple random sampling technique was deemed appropriate for this study because the researcher had a larger population size. It was very difficult to work with all the participants who manifested their desire to participate in the study. The researcher also wanted to avoid subjectivity in choosing the participants by employing the non-random sampling techniques. As such, the

simple random sampling allowed the researcher to pick the participant haphazardly. This helped to give equal chances to all the participants to be selected for the study.

Besides the simple random sampling technique, the researcher also employed the stratified sampling technique. The purpose of employing this sampling technique was simply because the sample size was made up of different stratum. We had the lecturers, staff, support staff and students. This made it very difficult to work at the same and on the same with the staff and the students. The best option was to divide the participants into stratum to avoid any potential intimidation.

Data Collection Instruments

Data collection methods refers to the different approaches which can be used to gather data and information from the field. The data collection instrument or approach adopted in a research depends on the nature and type of research approach. Basically, in a quantitative study, the most predominant use instrument is a questionnaire. In a qualitative study, interviews and focus group discussions can be used to collect data from the field. Since the objective of this study is to investigate the effects of ICT integration on the professionalisation of university studies, a questionnaire was seen as an appropriate instrument for data collection. A structured questionnaire was administered to students and faculty members. The questionnaire included sections on ICT access, usage in education, digital literacy, and perceptions of how ICT contributes to professional skill development.

Description of the questionnaire

A questionnaire is a data collection instrument that is mostly used in quantitative studies. This instrument is also used when a researcher is carrying out mixed-methods research. A closed-ended questionnaire was used to gather data from the participants in the study. This data collection instrument was chosen by the researcher for a number of reasons. One of the reasons why this instrument was chosen was that it is less time-consuming. This means that the instrument allowed the researcher to collect a huge quantity of data in less time compared to other instruments like interviews. Also, the questionnaire was chosen because it was easier to reach a bigger sample size.

The questionnaire was designed based on the Likert four-point point of measurement. The questionnaire was divided into four major parts. Part one of the questionnaire introduces the participants to the purpose of the study. It also focuses on presenting the researcher, her institution,

and the nature of the research. Part one also covers issues related to the principles of confidentiality and anonymity in research work. The researcher assured the participants at this level that their responses would remain confidential and only known to her. The researcher also assured the participants that under no circumstance will their identity be disclosed. This part ends with the instructions to the participants on how to answer the questionnaire.

Part two of the questionnaire focused on the independent variable and its modalities. This part is subdivided into four subparts. Section one here focuses on ICT infrastructural dispositions, which ranges from Q1 to Q5. Section two addresses items related to the provision of digital resources which ranges from Q6 to Q10. Section three centers on the items related to access to digital resources which ranges from Q11 to Q15. The last section here focuses on the availability of train lecturers which ranges from Q16 to Q20. These items are all derived from the various modalities of the independent variable.

Part three of the questionnaire addressed items related to the dependent variable of the study which is professionalisation of university studies. Five items were designed to measure this. The items range from Q21 to Q25. The fourth and the last part of the questionnaire is based on the socio-demographic variables such as gender, age, quality, and level of education. This part ranges from Q26 to Q29.

The weighting of the data collection instrument follows the Likert scale of measurement. The questionnaire was weighted as follows: Strongly agree was weighted 4, agree was weighted 3, and disagree was weighted 2, and strongly disagree was weighted 1. This different weighting was used to record the responses of the participants and also to rate the responses.

The questionnaire was administered based on the schedules and the availability of the participants. Since the researcher was dealing with educated individuals, the direct delivery mode was used for questionnaire administration. Questionnaires were given to the participants, and they personally and anonymously recorded their responses. This ensures the reliability and validity of the data collected as well as avoids bias conclusions.

Validity and reliability of the data collection instrument

These refer to the measures used by a researcher to verify whether a data collection instrument is valid and reliable. The purpose of ensuring the validity and reliability of the data collection

instrument is to be certain about the credibility and trustworthiness of the results, and also to avoid erroneous and biased conclusions.

Validity of the instrument

The validity of a research instrument is a measure of the truth or falsity of a data collection instrument. Validity of research instruments allows the researcher to verify whether the instrument measure what it seeks to measure. It is commonly classified under the internal and external validity. In this study, different forms of validity testing were used to measure the correctness or falsity of the questionnaire such as face validity, content validity, construct validity and external validity.

Talking of the face validity, the questionnaire was cross-checked by the supervisor and professionals to make sure that it was valid. The supervisor went through the questionnaire to verify the structure and the format of the instrument. In the end, adjustments and corrections were carried out so as to ensure the validity of the data collection instrument.

Also, content and construct validity were equally used to verify the conformity of the data collection instrument. With the content validity, the researcher wanted to make sure that the content of the questionnaire is actually the various elements of the research problem. As a result, corrections and adjustments were made by the researcher which helps in confirming the validity of the instrument.

For the external validity, the researcher made sure that the initial population for which the questionnaire was designed, was actually the one that answered the questionnaire. This helped us to avoid a situation whereby wrong persons could answer the questionnaire. The respect of the external validity principle allows for the generalisation of the results of the findings. All the forms of validity testing proves to be essential for the study as it allows us to carry out adjustments and corrections on the instrument.

Reliability of data collection instrument

Measuring the reliability of data collection instrument consists of testing the consistency of the data collection instrument. It refers to the ability of a data collection instrument to produce the same results over and over again.

In the case of this study, a pilot study was carried out in March 2025. The researcher targeted a smaller portion of the population having the same characteristics as the sample population. Some students of the faculty of education in the department of Curriculum and Evaluation were solicited for the pre-testing and re-testing of the instrument. To this end, a total of 53 questionnaires were administered to these students, both males and females. The purpose of conducting this study was to carry out corrections and adjustments to the research instrument. The table below presents the distribution of the pilot population.

Table 3: Distribution of the pilot study population

Category of participant	Pilot population		Total
	Male	Female	
Staff	7	5	12
Lecturer	4	6	10
Student	13	18	31
Total	24	29	53

Source: field survey, 2025.

Table 4: Scale: All Variables

Case Processing Summary			
		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	0.0
	Total	53	100.0

Source: field survey, 2025

- a. Listwise deletion based on all variables in the procedure.

Table 5: Cronbach`s Alpha results

Reliability Statistics	
Cronbach's Alpha	N of Items
.801	53

Source: field survey, 2025.

The tables above present the results of the pilot study. It should be noted that the pilot study was conducted to ensure the consistency of the data collection instrument. After analysis of the data collected from the participants, a Cronbach alpha of 0.801 was obtained. This value is positive indicating that the instrument is consistent and reliable. Based on this, we had to go ahead with the main study.

Data Analysis techniques

Data analysis methods refers to the approaches used by a researcher to analyses data collected from the field. The method of data analysis depends on the type of research approach used in the study. Since the purpose of this study was to investigate the effects of ICT integration on the professionalisation of university studies in the department of geography of the University of Yaoundé I, the quantitative approach for data analysis was adopted. The statistical data analysis method was therefore used for this study.

In this study, both descriptive statistics and inferential statistics were used to analyze the data. The descriptive statistics were used for the frequency distribution and percentages of the participants' responses. It focuses on the mean and standard deviation. The inferential statistics, on the other hand, were used to verify the research hypothesis of the study. In this regard. The simple linear regression analysis was used as a statistical test to verify the effects of ICT integration on the professionalisation of university studies. The Statistical Package for Social Sciences (SPSS 27) was used as the statistical tool for data analysis.

Ethical Considerations

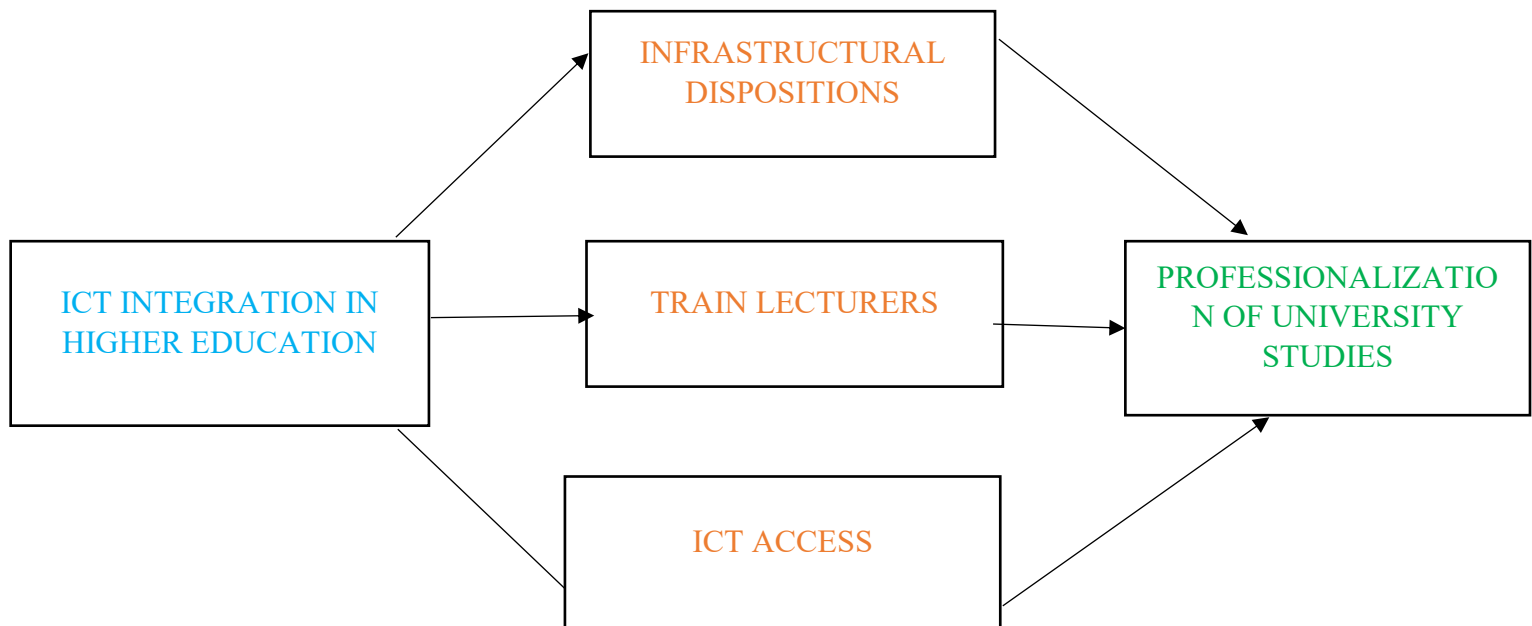
Ethical approval are obtained from the University of Yaoundé I's ethics committee. Informed consent is sought from all participants before conducting interviews or distributing questionnaires. Participants were assured of confidentiality, and their responses were to be anonymised. No sensitive personal data is collected or disclosed. The researcher also made sure that no participant was harmed by the research process. The participants were free to either participate or not in the study.

Identification of variables

Variables are units which can take different forms and shapes. They are elements which change as a result of some kind of manipulation. In this study, we had both the independent (ICT integration) and the dependent variables (Professionalisation of university studies). The independent variable

is the cause or predictive variable, while the dependent variable is the problem or the effect variable.

Figure 1: Identification of variables and modalities



Source: field survey, 2025.

Table 6: Synoptic table

GRH	SRH	IV	Modalities	Indicators	Items	DV	Modalities	Items	Instrument of data collection	Data analysis techniques
ICT integration has a statistically significant influence on the Professionalisation of University studies in the university of Yaoundé I.	ICT infrastructural dispositions has a statistically significant influence on the Professionalisation of University studies in the university of Yaoundé I.	IV 1	Infrastructural dispositions	- Multimedia hall - quality internet connection - multimedia center - internet connectivity - interactive tools	Q1-Q5	Professionalisation of university studies	Strongly agree Agree Disagree Strongly disagree	Q21 - Q25	A questionnaire of closed questions	Statistical data analysis techniques (descriptive and inferential statistics) Simple linear

	Provision of digital resources has a statistically significant influence on the Professionalisation of University studies at the University of Yaoundé I.	IV 2	Provision of digital resources	-qualified staff -learning management system -digital library - electricity -sufficient finances	Q6- Q10						regression
	Availability of trained lecturers has a statistically significant influence on the Professionalisation of	IV 3	Availability of trained lecturers	-use of ICT tools - regular update -in service training - confidence	Q11 - Q15						

	University studies at the university of Yaoundé I.			e in using ICT tools Support programs for students						
	Access to digital technologies are strong and positive determinant of Professionalisation of University studies at the University of Yaoundé I.	IV 4	ICT Access	-equal access - disparities - appropriate access mechanism for the disabled -ICT facilities -support programs	Q16 - Q20					

Source: field survey, 2025.

CHAPTER 4

DATA ANALYSIS, AND PRESENTATION OF RESULTS

The present chapter focuses on the data analysis. The first part of the chapter is based on the presentation of the data analyzed, and the second part focuses on the interpretation of the results. Both the descriptive and the inferential statistics results are presented in this chapter.

Presentation of the descriptive statistics results

The present section focuses on the presentation of the results of the descriptive statistics of the study. The descriptive statistics present the frequency and percentage distribution of the participants' responses. It also presents the mean and the standard deviation of each of the items analysed. The following tables present the descriptive results of the study.

Table 7: Distribution of participants by gender

		Frequency	Percentage
Valid	MALE	149	54.0
	FEMALE	127	46.0
	Total	276	100.0

Source: field survey, 2025.

The table above presents the distribution of the participants of the study according to their gender. It is observed that a total of 149 participants, corresponding to 54% were male participants. It is also seen from the table that a total of 127 participants, corresponding to 46% were of female sex. There is a slight difference between the male and the female participation, though it did not affect our results in any way. This slight difference can be explained by the fact that the majority of the male population manifested high interest in participating in the study.

Table 8: Distribution of the participants according to age

		Frequency	Percentage
Valid	15-20 YEARS	57	20.7
	21-30 YEARS	97	35.1
	31-40 YEARS	74	26.8
	41-50 YEARS	25	9.1
	50 AND ABOVE	23	8.3
	Total	276	100.0

Source: field survey, 2025

The above table presents the distribution of the participants of the study according to their age. It is revealed that the majority of the participants, 97, amounting to 35.1% were aged between 21 to 30 years. This dominance is a result of the fact that the majority of university students lie within this age range. This is followed by the age range 31 to 40, which recorded 74 (26.8%), and the age range 15 to 20 years, which recorded 57 (20.7). Also, 25 of the participants (9.1%) and 23 participants (8.3%) were aged between 41 to 50 years and 50 and above years, respectively.

Table 9: Distribution of the participants according to quality

		Frequency	Percentage
Valid	STAFF	46	16.3
	STUDENTS	231	83.7
	Total	276	100.0

Source: field survey, 2025

The table above presents the descriptive statistics on the distribution of the participants according to their status or quality. It is observed that the students constituted the majority of the population, with a total of 231 participants, amounting to 83.7%. A total of 46 staff participated in the study, amounting to 16.3%. The students constitute the majority of the study population. This difference accounts for the fact that the student category of the population manifested a high interest in participating in the study, and they were readily available.

Table 10: Distribution of the participants according to level of education

		Frequency	Percentage
Valid	BELOW FIRST DEGREE	58	21.0
	BACHELOR DEGREE	82	29.7
	MASTER DEGREE	92	33.3
	PhD DEGREE	44	15.9
	Total	276	100.0

Source: field survey, 2025

The table above presents the descriptive statistics on the distribution of the participants of the study according to the level of education. It is observed that the majority of the participants (92, 33.3%) were holders of a master's degree. Also, 82 of the participants, amounting to 29.7% were holders of a bachelor's degree. Students with a first degree recorded a total of 58 participants, amounting

to 21%. A total of 44 participants (15.9%) were said to be holders of a PhD degree. This variation in the level of education of participants made the findings credible and very reliable.

Table 11: Distribution of participants' responses on ICT infrastructural dispositions

No	Item	SA		A		D		SD		Mean	Std d
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>F</i>	%		
1	The Geography department has a well-equipped multimedia hall with the latest generation computers.	60	21.7	107	38.8	66	23.9	43	15.6	2.6667	.98596
2	Internet connection is fast when downloading videos, streaming lectures, and downloading large research papers.	82	29.7	116	42.0	70	25.4	8	2.9	2.9855	.81785
3	There is an operational multimedia centre to meet the needs of students and faculty members.	66	23.9	130	47.1	67	24.3	13	4.7	2.9022	.81432
4	The department has Internet connectivity and Wi-Fi networks with high speed supporting access to digital resources.	74	26.8	96	34.8	86	31.2	7.2	20	2.8188	.92430
5	The department has sufficient interactive tools such as projectors, and smartboards, whiteboard, microphones to facilitate learning.	62	22.5	112	40.6	79	28.6	23	8.3	2.7717	.89162
Total		276				2.8289				.88681	

Source: field survey, 2025

To gather the view of the participants regarding the ICT infrastructural dispositions in the department of geography, a total of five items were designed. Majority of the participants (107) amounting to 38.8% agree to the fact that the department has a well equip multimedia hall. A handful of participants (116) amounting to 42% were of the view that the quality of the internet is good. Also, 130 participants (47.1%) agree that operational multimedia center meets the need of the students. Similarly, majority of the participants (96, 34.8%) agree to the fact that the department has internet connectivity and free wireless networks supporting access to digital resources. A total of 112 participants corresponding to 40.6% were of the view that the department has interactive tools such as projectors, smart boards, white boards etc.

The cut off mean for this objective were 2.5 and 3.5. None of the mean happened to be less than 2.5 or over than 3.5. This therefore means that with a mean total of 2.8289 and standard deviation

of .88681, the majority of the respondents agree that ICT infrastructural dispositions are a positive determinant of the professionalisation of university studies in the University of Yaounde I.

Table 12: Distribution of participants' responses on the provision of digital resources

No	Item	SA		A		D		SD		Mean	Std d
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>F</i>	%		
6	The faculty has qualified ICT personnel to support teaching and learning activities.	58	21.0	103	37.3	84	30.4	31	11.2	2.7391	.89690
7	The department operates with the Learning Management System to facilitate the administration, documentation, tracking, reporting, and delivery of educational courses or training programs.	53	19.2	111	40.2	71	25.7	41	14.9	2.6812	.93018
8	Your department has a well-equipped digital library accessible to all students	56	20.3	105	38.0	93	33.7	22	8.0	2.6377	.95683
9	Electricity is provided daily in your school.	56	20.3	105	38.0	93	33.7	30	10.9	2.7065	.88055
10	Your school possesses sufficient finances to ensure the effectiveness of distance learning.	59	21.4	111	40.2	81	29.3	25	9.1	2.7065	.88877
Total		276								2.6942	.91064

Source: field survey, 2025

To collect the view of the participants regarding the provision of digital resources in the department of geography, a total of five items were designed. Majority of the participants (103) amounting to 37.3% agree to the fact that the department has qualified ICT personnel to support teaching. A handful of participants (111) amounting to 40.2% were of the view that the department operates with the digital management system. Also, 105 participants (38%) agree that well equip digital library facilitate lectures assimilation. Similarly, majority of the participants (305, 38%) agree to the fact that the electricity is provided on daily basis in the university. A total of 111 participants corresponding to 40.2% were of the view that the school possesses adequate fund to support distance education.

The cut off mean for this objective were 2.5 and 3.5. None of the mean happened to be less than 2.5 or over than 3.5. This therefore means that with a mean total of 2.6942 and standard deviation of .91064, the majority of the respondents agrees that the provision of digital resources is a positive determinant of the professionalisation of university studies in the University of Yaoundé I.

Table 13: Distribution of participant's responses on availability of trained lecturers

No	Item	SA		A		D		SD		Mean	Std d
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>F</i>	%		
11	Lecturers effectively integrate ICT tools into their teaching practices.	62	22.5	86	31.2	92	33.3	36	13.0	2.6304	.97291
12	ICT training for lecturers is regularly updated to keep pace with technological advancements.	53	19.2	119	43.1	66	23.9	36	13.0	2.6775	.93867
13	Lecturers receive ongoing professional development related to ICT use in their teaching.	65	23.6	98	35.5	87	31.5	26	9.4	2.7319	.92669
14	Trained personnel are available to assist students with technology-related issues (e.g., accessing online resources).	47	17.0	118	42.8	79	28.6	32	11.6	2.6522	.89566
15	Lecturers are confident in using ICT resources to enhance student engagement and learning outcomes.	64	23.2	99	35.9	82	29.7	31	11.2	2.7101	.94736
Total		276								2.6803	.93625

Source: field survey, 2025

To collect the view of the participants regarding the availability of trained lecturers in the department of geography, a total of five items were designed. Majority of the participants (92) amounting to 33.3% disagree to the fact that lecturers effectively integrate ICT tools in class. A handful of participants (119) amounting to 43.1% were of the view that ICT training for lecturers was regularly updated. Also, 98 use participants (35.5%) agree that lecturers receive top-up courses to ensure their professional development in ICT integration. Similarly, majority of the participants (118, 42.8%) agree to the fact that trained personnel are available to assist students with technology related issues. A total of 99 participants corresponding to 35.9% and 82 (29.7%) agree and disagree to the fact that lecturers were confident of using ICT tools in class.

The cut off mean for this objective were 2.5 and 3.5. None of the mean happened to be less than 2.5 or over than 3.5. This therefore means that with a mean total of 2.6803 and standard deviation of .93625, the majority of the respondents agrees that the availability of trained lecturers is a positive determinant of the professionalisation of university studies in the University of Yaoundé I. This means that the availability of trained personnel to assist in ICT integration during lectures is a positive and strong predictor of the professionalisation of university studies in the department of geography in the University of Yaoundé I.

Table 14: Distribution of participants' responses on access and equity to ICT

No	Item	SA		A		D		SD		Mean	Std d
		<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%		
16	All students have equal access to ICT resources (e.g., computers, software, and the internet) in the university.	57	20.7	11	3.9	72	26.1	34	12.3	2.6993	.93428
17	There are no significant disparities in ICT access between different faculties or departments at the university.	69	25.0	95	34.4	82	29.7	30	10.9	2.7355	.95668
18	Students with disabilities have appropriate access to ICT resources necessary for their studies.	63	22.8	12	4.2	64	23.2	27	9.8	2.8007	.90260
19	The university ensures that ICT facilities are available to all students outside regular class hours.	69	25.0	97	35.1	80	30.4	26	9.4	2.7572	.93563
20	There are programs to support underrepresented groups (e.g., women, minorities) in accessing ICT resources.	59	21.4	12	4.9	69	25.0	24	8.7	2.7899	.87762
Total		276								2.7565	.92136

Source: field survey, 2025

To collect the view of the participants regarding the ICT access in the department of geography, a total of five items were designed. Majority of the participants (113) amounting to 40.9% agree to the fact that all students have equal access to ICT resources. A handful of participants (95), amounting to 34.4% were of the view that there are no significant disparities in ICT access in the university. Also, 122 participants (44.2%) agree that students with disabilities have appropriate access to ICT in the department. Similarly, majority of the participants (97, 35.1%) agree to the fact that ICT facilities are accessible to all the students. A total of 124 participants corresponding to 44.9% and 69 (25.0%) agree and disagree to the fact that there are programs to support underrepresented groups in accessing ICT resources.

The cut off mean for this objective were 2.5 and 3.5. None of the mean happened to be less than 2.5 or over than 3.5. This therefore means that with a mean total of 2.7565 and standard deviation of .92136, the majority of the respondents agrees that the ICT access and equity is a positive determinant of the professionalisation of university studies in the University of Yaounde I. This means that ICT access is a positive and strong predictor of the professionalisation of university studies in the Department of Geography at the University of Yaounde I.

Table 15: Distribution of participants' responses on professionalisation of university studies

No	Item	SA		A		D		SD		Mean	Std d
		<i>F</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%		
21	The university provides opportunities for students to engage in ICT-related projects or internships in companies.	73	26.4	10 2	37.0	78	28. 3	2 3	8. 3	2.8152	.92161
22	The university offers workshops and seminars on the use of ICT for career readiness.	80	29.0	12 4	44.9	56	20. 3	1 6	5. 8	2.9710	.85231
23	I have access to mentors or advisors who help me integrate ICT into my professional pathway.	88	31.9	11 9	43.1	56	20. 3	1 3	4. 7	3.0217	.84395
24	My courses encourage the development of ICT skills that are applicable in real-world job environments.	85	30.8	13 6	49.3	47	17. 0	8 9	2. 9	3.0797	.76811
25	I feel confident in using ICT resources to enhance my academic and professional skills.	56	20.3	13 7	49.6	71	25. 7	1 2	4. 3	2.8587	.78506
Total		276								2.9492	.83421

Source: field survey, 2025

To collect the views of the participants regarding the availability of trained lecturers in the department of geography, a total of five items were designed. Majority of the participants (102) amounting to 37.0% agree to the fact that the university provides opportunities for students to engage in ICT projects. A handful of participants (124) amounting to 44.9% were of the view that workshops and seminars are organized on the use of ICT in school. Also, 119 participants (43.1%) agree that mentors are available to assist students in the use of ICT tools. Similarly, majority of the participants (136, 49.3%) agree to the fact that some courses lay emphasis on the development of ICT skills among students. A total of 137 participants corresponding to 49.6% and 71 (25.7%) agree and disagree to the fact students feels confident in using ICT resources to enhance their academic and professional skills.

The cut off mean for this objective were 2.5 and 3.5. None of the mean happened to be less than 2.5 or over than 3.5. This therefore means that with a mean total of 2.9492 and standard deviation of .83421, the majority of the respondents agrees that the professionalisation of university studies is determine by the ICT integration in the University of Yaoundé I. This means that there exist a positive and strong relationship between ICT integration and the professionalisation of university studies in the department of geography in the University of Yaoundé I.

Inferential statistics

The above section focused on the presentation of the results of the descriptive statistics. The present section focuses on the inferential statistics of the study. This involves the verification of the research hypotheses. To do this, we start by establishing the relationship between variables using the Pearson correlation coefficient. The table below presents the Pearson correlation coefficient results for the variables of the study.

Table 16: Pearson correlation coefficient table between variables

		ICT infrastructural dispositions	Provision of digital resources	Availability of trained lecturers	ICT access and equity	Professionalis ation of university studies
ICT Infrastructural Dispositions	Pearson Correlation coefficient	1	.459**	.702**	.272*	.573**
	Sig. (bilateral)		.000	.001	.002	.000
	N	276	276	276	276	276
Provision of digital resources	Pearson Correlation coefficient	.459**	1	.470	.780**	.342**
	Sig. (bilateral)	.000		.000	.002	.000
	N	276	276	276	276	276
Availability of trained lecturers	Pearson Correlation coefficient	.702**	.470	1	.277*	.632**
	Sig. (bilateral)	.001	.000		.000	.001
	N	276	276	276	276	276
ICT Access and equity	Pearson Correlation coefficient	.272*	.780**	.277*	1	.401**
	Sig. (bilateral)	.002	.002	.000		.002
	N	276	276	276	276	276
Professionalisa tion of university studies	Pearson correlation coefficient	.573**	.342**	.632**	.401**	1
	Sig. (bilateral)	.000	.000	.001	.002	
	N	276	276	276	276	276

**. Correlation is significant at the 0.01 level (2-tailed).

Source: field survey, 2025

Verification of research hypothesis one

Regression analysis is a statistical test that helps in determining the extent of the relationship between the dependent and the independent variables. Considering the objective of this study, the regression analysis was seen as the appropriate test for hypothesis testing. To test the effect of ICT infrastructural dispositions on the professionalisation of university studies, it is primordial to formulate the null and the alternative hypotheses.

Ha1: ICT infrastructural dispositions have a statistically significant effect on the professionalisation of university studies in the department of geography.

H01: ICT infrastructural dispositions have no statistically significant effects on the professionalisation of university studies in the department of geography.

Regression was carried out to ascertain the extent to which ICT infrastructural dispositions have an impact on the professionalisation of university studies.

All the tables below present the linear regression test that was carried out to determine the effects of ICT infrastructural dispositions on the professionalisation of university studies in the department of geography.

Table 17: Model summary table for ICT infrastructural dispositions

Model	R	R-square	Adjusted R-square	Std error of the estimate
1	.573 ^a	.047	.046	.26079

The table above represents the model summary for ICT infrastructural dispositions and professionalisation of university studies in the department of geography in the University of Yaoundé I. R^2 represents the proportion of the variance in the dependent variable (professionalisation of university studies) that is explained by the independent variable (ICT infrastructural dispositions). In this case, 0.47 means that 47% of the variation in professionalisation of university studies can be explained by the quality of ICT infrastructures available at the University of Yaounde I. This, therefore, means that the model is a good fit for the data.

Table 18: ANOVA table for ICT infrastructural dispositions

Model		Sum of square	Df	Mean	F	Sig.
1	Regression	6.940	1	6.940	31.486	.000. ^b
	Residual	1279.307	274	4.669		
	Total	1286.246	275			

a. Dependent variable: Professionalisation of university studies

b. Predictor: ICT infrastructural dispositions

The ANOVA table tests the overall significance of the regression model. This is intended to determine the extent of the relationship between ICT infrastructural dispositions and professionalisation of university studies in the geography department of the University of Yaoundé I. The F-statistic tests the null hypothesis that all the regression coefficients (except the constant) are equal to zero. It measures whether the model explains a significant amount of variation in the dependent variable.

Since the F-statistic is equal to 31.486, $df = 1, 274$, and $p\text{-value} = 0.000$, which is less than 0.05, which is the alpha, we reject the null hypothesis and accept the alternative hypothesis. This therefore indicates that the model as a whole is statistically significant. This means that ICT infrastructural dispositions significantly predict the professionalisation of university studies in the department of Geography of the University of Yaounde I.

Table 19: Coefficient table for ICT infrastructural dispositions

Model		Unstandardized coefficient		Standardized coefficient		Sig.
		B	Std error	Beta	t	
1	(Constant)	13.776	.807		17.079	.000
	ICT infrastructura l dispositions	.769	.056	.573	1.219	.000

a. Constant: Professionalisation of university studies

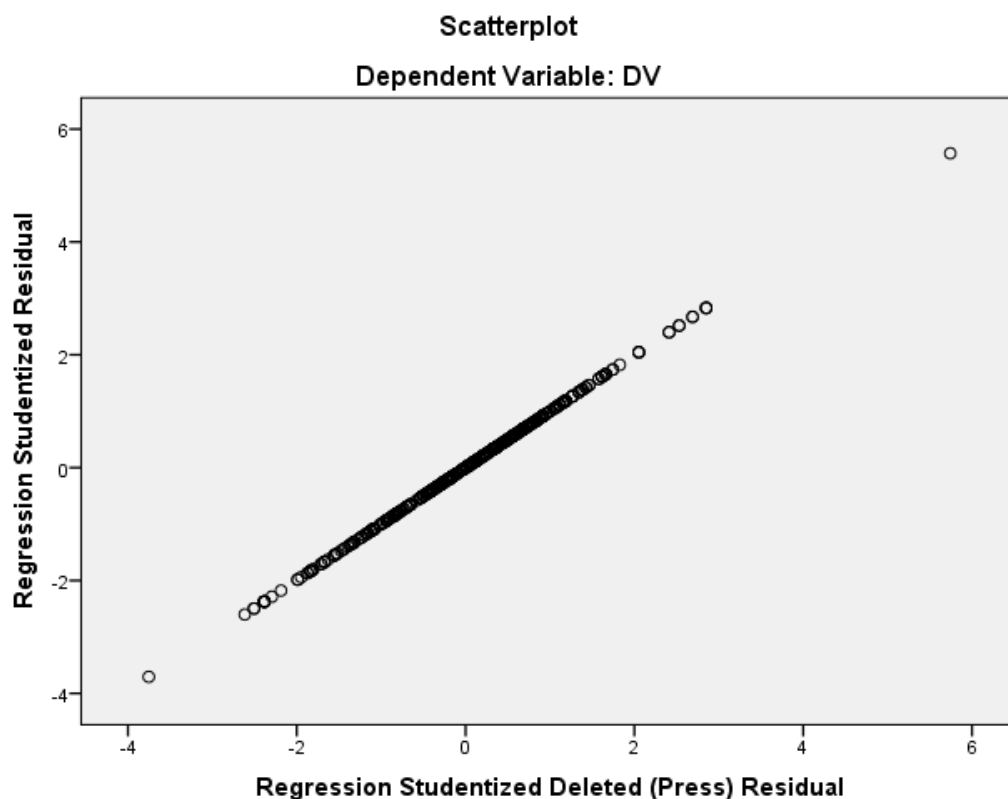
b. Predictor: ICT infrastructural dispositions

The table above presents the regression coefficients between ICT infrastructural dispositions and professionalisation of university studies. From the table, the standard error is = 0.807 which represents the uncertainty in the estimate of the coefficient. Standard error (0.807) indicates a more

precise estimate. The unstandardized coefficient (B) for ICT infrastructural dispositions is = 7.69. This means that for any additional unit on ICT infrastructural dispositions, the predicted level of professionalisation of university studies increases by 7 units, indicating the slope of the regression line.

Since the t-statistic for ICT infrastructural dispositions is equal to 1.219, with p-value = 0.000, less than the alpha (0.05), we reject the null hypothesis and accept the alternative hypothesis. This means that ICT infrastructural dispositions is a significant predictor of the level of professionalisation of university studies in the department of geography of the University of Yaounde I.

Figure 2: Scattered plot for ICT infrastructural dispositions and professionalisation



The scattered plot above reveals the nature of the relationship between ICT infrastructural dispositions and the professionalisation of university studies. The points slope upward from left to right. This implies that as the independent variable (ICT infrastructural dispositions) increases, the dependent variable (professionalisation of university studies) also increases. This means that there is a positive relationship between ICT infrastructural dispositions and the professionalisation of university studies in the department of geography of the University of Yaoundé I.

Verification of research hypothesis two

To test the effect of the provision of digital resources on professionalisation of university studies, it is primordial to formulate the null and the alternative hypothesis.

Ha1: the provision of digital resources has a statistically significant effects on the professionalisation of university studies in the department geography.

H01: the provision of digital resources has no statistically significant effects on the professionalisation of university studies in the department geography.

Regression was carried out to ascertain the extent to which the provision digital resources has an impact on the professionalisation of university studies.

All the tables below present the linear regression test that was carried out to determine the effects of the provision of digital resources on the professionalisation of university studies in the department of geography.

Table 20: Model summary for the provision of digital resources

Model	R	R-square	Adjusted R-square	Standard error of the estimate
1	.342 ^a	.239	.233	2.15900

The table above represents the model summary for the provision of digital resources and professionalisation of university studies in the department of geography in the University of Yaounde I. R^2 represents the proportion of the variance in the dependent variable (professionalisation of university studies) that is explained by the independent variable (provision of digital resources). In this case, 0.239 means that 23% of the variation in professionalisation of university studies can be explained by the provision of digital resources at the University of Yaounde I. This therefore means that the model is a good fit for the data.

Table 21: ANOVA table for the provision of digital resources

Model		Sum of square	Df	Mean	F	Sig.
1	Regression	9.056	1	9.056	44.943	.000 ^b
	Residual	1277.190	274	4.661		
	Total	1286.246	275			

a. Dependent variable: Professionalisation of university studies

b. Predictors: Provision of digital resources

The ANOVA table tests the overall significance of the regression model. This is intended to determine the extent of the relationship between provision of digital resources and professionalisation of university studies in the geography department of the University of Yaounde I. The F-statistic tests the null hypothesis that all the regression coefficients (except the constant) are equal to zero. It measures whether the model explains a significant amount of variation in the dependent variable.

Since the F-statistic is equal to 44.943, $df = 1, 274$, and $p\text{-value} = 0.000$ which is less than 0.05, which is the alpha, we reject the null hypothesis and accept the alternative hypothesis. This therefore indicates that the model as a whole is statistically significant. This means that the provision of digital resources significantly predict the professionalisation of university studies in the department of Geography of the University of Yaounde I.

Table 22: Coefficients table for the provision of digital resources

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Standard error	Beta		
1	(Constant)	13.703		18.044	.000
	Provision of digital resources	.077	.342	1.394	.000

a Constant: Professionalisation of university studies

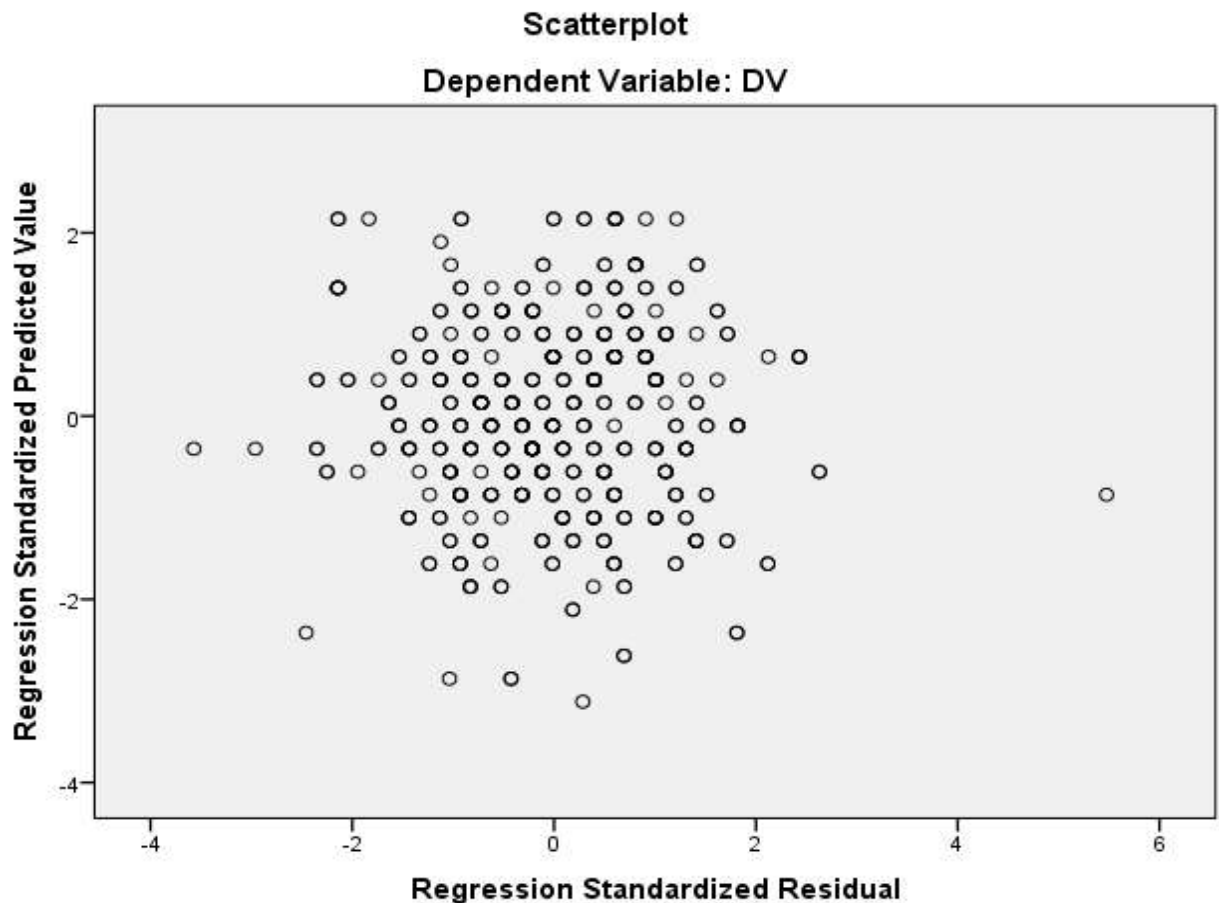
b Predictor: Provision of digital resources

The table above presents the regression coefficients between provision of digital resources and professionalisation of university studies. From the table, the standard error is = 0.561 which represents the uncertainty in the estimate of the coefficient. Standard error (0.561) indicates a more precise estimate. The unstandardized coefficient (B) for the provision of digital resources is = 7.7. This means that for any additional unit on provision of digital resources, the predicted level of professionalisation of university studies increases by 7 units, indicating the slope of the regression line.

Since the t-statistic for the provision of digital resources is equal to 1.394, with $p\text{-value} = 0.000$, less than the alpha (0.05), we reject the null hypothesis and accept the alternative hypothesis. This means that the provision of digital resources is a significant predictor of the level of

professionalisation of university studies in the department of geography of the University of Yaoundé I.

Figure 3: Scattered plot for the provision of digital resources and professionalisation



The scattered plot above reveals the nature of the relationship between the provision of digital resources and the professionalisation of university studies. The points slope upward from left to right. This implies that as the independent variable (provision of digital resources) increases, the dependent variable (professionalisation of university studies) also increases. This means that there is a moderate relationship between the provision of digital resources and the professionalisation of university studies in the department of geography of the University of Yaounde I.

Verification of research hypothesis three

To test the effects of the availability of trained lecturers on professionalisation of university studies, it is primordial to formulate the null and the alternative hypothesis.

Ha1: The availability of trained lecturers has a statistically significant effects on the professionalisation of university studies in the department geography.

Ha1: the availability of trained lecturers has no statistically significant effects on the professionalisation of university studies in the department geography.

Regression was carried out to ascertain the extent to which the availability of trained lecturers has an impact on the professionalisation of university studies.

All the tables below present the linear regression test that was carried out to determine the effects of the availability of trained lecturers on the professionalisation of university studies in the department of geography.

Table 23: Model summary table for trained lecturers

Model	R	R-square	Adjusted R-square	Standard error of the estimate
1	.632 ^a	.419	.412	2.16202

The table above represents the model summary for the availability of trained lecturers and professionalisation of university studies in the department of geography in the University of Yaounde I. The R^2 represents the proportion of the variance in the dependent variable (professionalisation of university studies) that is explained by the independent variable (availability of trained lecturers). In this case, 0.419 means that 41.9% of the variation in professionalisation of university studies can be explained by the availability of trained lecturers at the University of Yaounde I. This therefore means that the model is a good fit for the data.

Table 24: ANOVA table for availability of trained lecturers

Model		Sum of squares	Df	Mean	F	Sig.
1	Regression	5.482	1	5.482	28.173	.001 ^b
	Residual	1280.764	274	4.674		
	Total	1286.246	275			

a. dependent variable: professionalisation

b. Predictor: trained lecturers

The ANOVA table tests the overall significance of the regression model. This is intended to determine the extent of the relationship between availability of trained lecturers and professionalisation of university studies in the geography department of the University of Yaounde I. The F-statistic tests the null hypothesis that all the regression coefficients (except the constant)

are equal to zero. It measures whether the model explains a significant amount of variation in the dependent variable.

Since the F-statistic is equal to 28.173, $df = 1, 274$, and $p\text{-value} = 0.001$ which is less than 0.05, which is the alpha, we reject the null hypothesis and accept the alternative hypothesis. This therefore indicates that the model as a whole is statistically significant. This means that the availability of trained lecturers significantly predict the professionalisation of university studies in the department of Geography of the University of Yaounde I.

Table 25: Coefficients table for trained lecturers

Model		Unstandardized coefficients		Standardized coefficients		Sig.
		B	Standard error	Beta	T	
1	(Constant)	13.982	.718		19.487	.000
	Trained lecturers	.057	.053	.632	1.083	.001

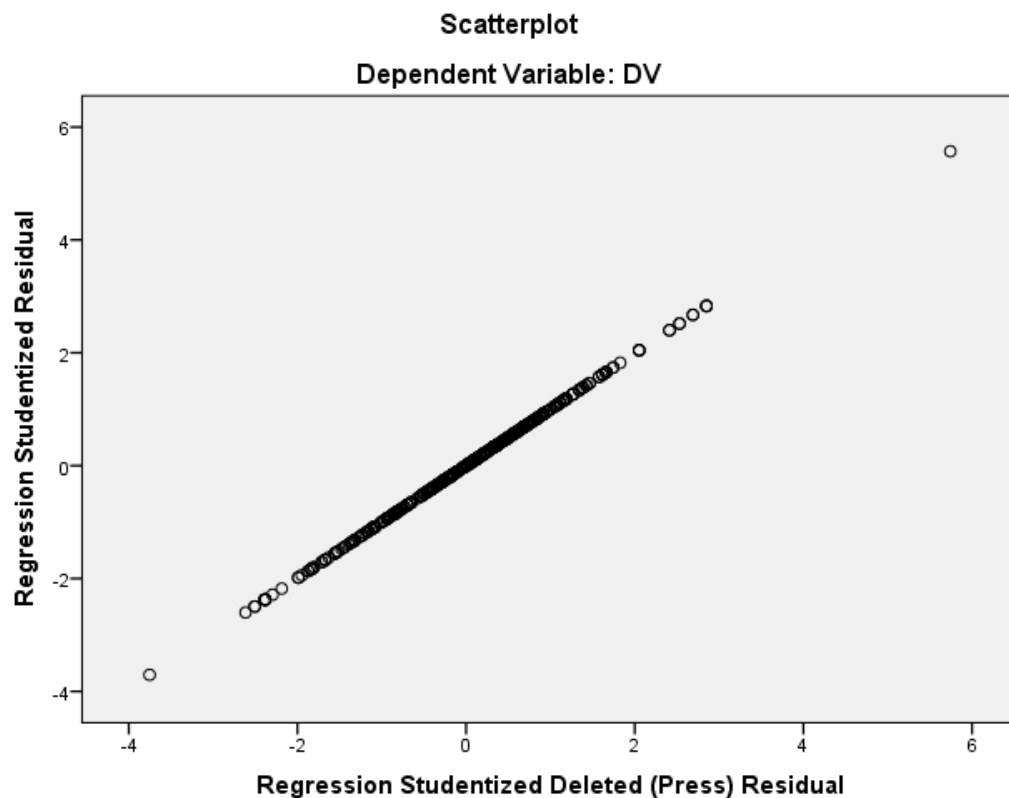
a. Constant: Professionalisation

b. Predictor: Trained lecturers

The table above presents the regression coefficients between availability of trained lecturers and professionalisation of university studies. From the table, the standard error is = 0.53 which represents the uncertainty in the estimate of the coefficient. Standard error (0.53) indicates a more precise estimate. The unstandardized coefficient (B) for the availability of trained lecturers is = 5.7. This means that for any additional unit on provision of digital resources, the predicted level of professionalisation of university studies increases by 7 units, indicating the slope of the regression line.

Since the t-statistic for the provision of digital resources is equal to 1.083, with $p\text{-value} = 0.001$, less than the alpha (0.05), we reject the null hypothesis and accept the alternative hypothesis. This means that the availability of trained lecturers is a significant predictor of the level of professionalisation of university studies in the department of geography of the University of Yaounde I.

Figure 4: Scattered plot for the availability of trained lecturers and professionalisation



The scattered plot above describes the nature of the relationship between the availability of trained lecturers and the professionalisation of university studies. The points slope upward from left to right. This implies that as the independent variable (availability of trained lecturers) increases, the dependent variable (professionalisation of university studies) also increases. This means that there is a moderate relationship between the availability of trained lecturers and the professionalisation of university studies in the department of geography of the University of Yaounde I.

Verification of research hypothesis four

To test the effects of the ICT access on professionalisation of university studies, it is primordial to formulate the null and the alternative hypotheses.

Ha1: The ICT access has a statistically significant effect on the professionalisation of university studies in the department of geography.

Ha1: The ICT access has no statistically significant effect on the professionalisation of university studies in the department of geography.

Regression was carried out to ascertain the extent to which the ICT access has an impact on the professionalisation of university studies.

All the tables below present the linear regression test that was carried out to determine the effect of the ICT access on the professionalisation of university studies in the department of geography.

Table 26: Model summary for ICT access

Model	R	R-square	R-square	Standard error of the estimate
1	.227 ^a	.154	.147	2.16487

a. Professionnalisation (Constant)

b. ICT access (Predictor)

The table above represents the model summary for ICT access and professionalisation of university studies in the department of geography in the University of Yaounde I. The R^2 represents the proportion of the variance in the dependent variable (professionalisation of university studies) that is explained by the independent variable (availability of trained lecturers). In this case, 0.154 means that 15.4% of the variation in professionalisation of university studies can be explained by the ICT access at the University of Yaounde I. This therefore means that the model is a good fit for the data.

Table 27: ANOVA table for ICT access

Model		Sum of squares	df	Mean	F	Sig.
1	Regression	2.104	1	2.104	20.449	.002 ^b
	Residual	1284.142	274	4.687		
	Total	1286.246	275			

a. dependent variable: professionalisation

b. Predictor: ICT access

The ANOVA table tests the overall significance of the regression model. This is intended to determine the extent of the relationship between ICT access and professionalisation of university studies in the geography department of the University of Yaounde I. The F-statistic tests the null hypothesis that all the regression coefficients (except the constant) are equal to zero. It measures whether the model explains a significant amount of variation in the dependent variable.

Since the F-statistic is equal to 20.449, $df = 1, 274$, and $p\text{-value} = 0.002$ which is less than 0.05, which is the alpha, we reject the null hypothesis and accept the alternative hypothesis. This therefore indicates that the model as a whole is statistically significant. This means that the ICT access significantly predict the professionalisation of university studies in the department of Geography of the University of Yaounde I.

Table 28: Coefficients table for ICT access

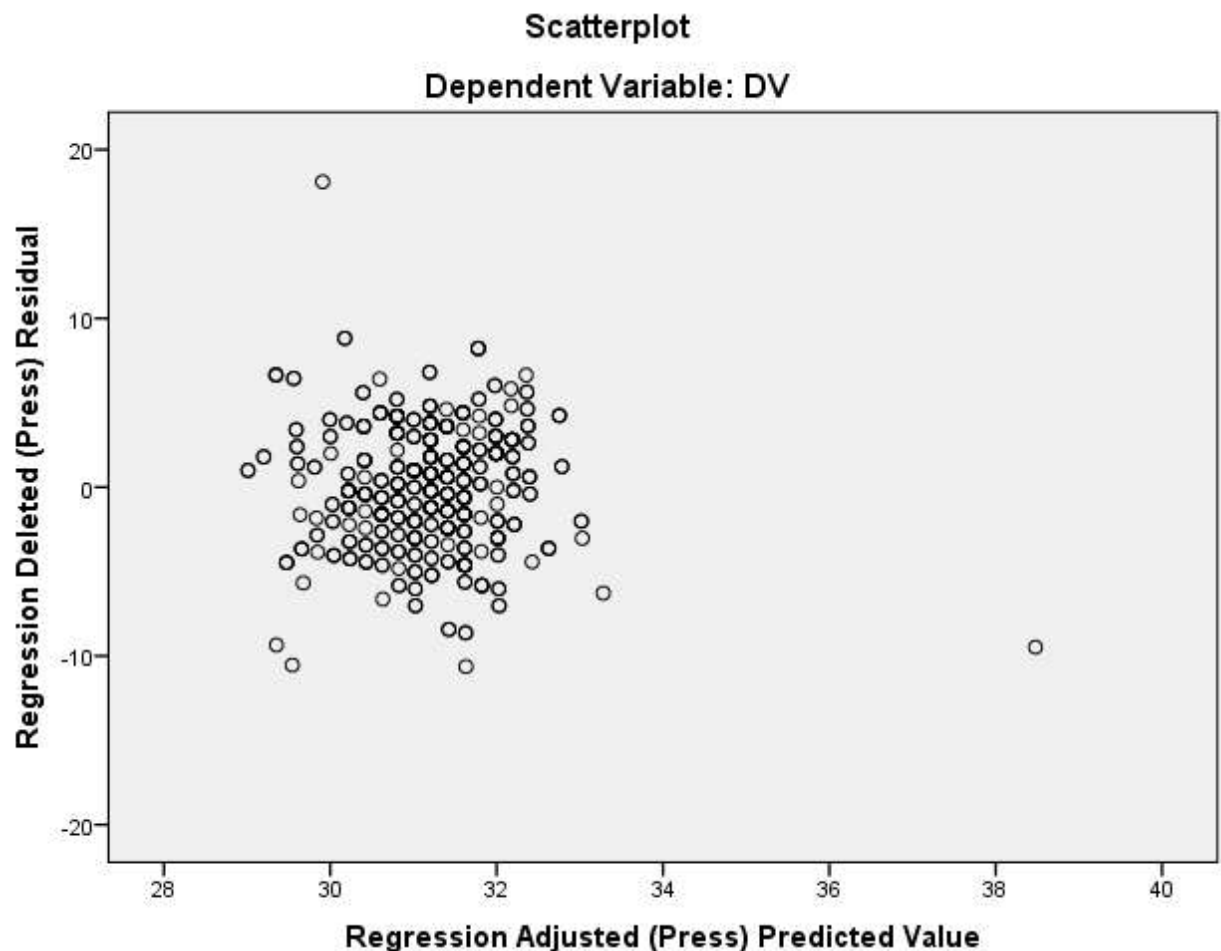
Model		Unstandardized coefficients		Standardized coefficients		Sig.
		B	Standard error	Beta	T	
1	(Constant)	15.244	.755		20.199	.000
	ICT access	.036	.054	.227	1.670	.002

- a. Dependent variable: professionalisation
- b. Predictor: ICT access

The table above presents the regression coefficients between ICT access and professionalisation of university studies. From the table, the standard error is = 0.54 which represents the uncertainty in the estimate of the coefficient. Standard error (0.54) indicates a more precise estimate. The unstandardized coefficient (B) for ICT access is = 3.6. This means that for any additional unit on ICT access, the predicted level of professionalisation of university studies increases by 3 units, indicating the slope of the regression line.

Since the t-statistic for the provision of digital resources is equal to 1.670, with $p\text{-value} = 0.002$, less than the alpha (0.05), we reject the null hypothesis and accept the alternative hypothesis. This means that the ICT access is a significant predictor of the level of professionalisation of university studies in the department of geography of the University of Yaounde I.

Figure 5: Scattered plot for ICT access and professionalisation



The scattered plot above describes the nature of the relationship between the ICT access and the professionalisation of university studies. The points slope upward from left to right. This implies that as the independent variable (ICT access) increases, the dependent variable (professionalisation of university studies) also increases. This means that there is a moderate relationship between the ICT access and the professionalisation of university studies in the department of geography of the University of Yaounde I.

Interpretation of the results of the study

Interpretation of the results of the findings in a research work is seen as an important step in research. This involves given a logical and coherent meaning to the findings of the study. It is a kind of critical analysis and synthesis of the empirical findings to derive meaningful insights, draw conclusions, and make inferences based on the results gotten after data analysis. The researcher made use of the research objectives to interpret the findings of the study.

Research objective one

In the first research objective, the researcher wanted to investigate the effects of ICT infrastructural dispositions on the professionalisation of university studies in the University of Yaounde I. The regression analysis was used to affirm or refute the relationship between the independent and the dependent variables. The dependent variable was therefore regressed on the independent variable (IV1). It is found out that the independent variable (ICT infrastructural dispositions) significantly predict the professionalisation of university studies with $F\text{-statistic} = (1-274) = 31.486$, $p\text{-value} = 0.000$. Also, the $R^2 = 47$ depicts that the model explains 47% variation in the professionalisation of university studies. Furthermore, the regression coefficient was assessed to ascertain the effects of the ICT infrastructural dispositions on professionalisation of university studies. The results indicated that ICT infrastructural dispositions exerts a positive and strong influence on the professionalisation of university studies with $B = .573$, $t\text{-statistic} = 1.219$, $p\text{-value} = 0.000$. Based on this, the null hypothesis is rejected and the alternative hypothesis accepted which states that ICT infrastructural dispositions exerts a significant effect on the professionalisation of university studies in the department of geography in the University of Yaounde I.

The above results imply that the professionalisation of university studies require that they should be effective and efficient integration of ICT tools at all levels in the university. For this to happen, university authorities are required to pay an attention to the nature and quality of digital infrastructures available at the university. This is because effective professionalisation passes through the use of digital technology. This requires the entire university to afford and equip multimedia hall and centers with sophisticated and latest generation ICT tools. Also, attention need to be paid on the quality of the internet connectivity as well as operational digital learning centers in each department to facilitate ICT integration. All this will go a long way to positively influence professionalisation of university studies and prepares the graduates for the requirements of the job market.

Research objective two

In the second research objective, the researcher wanted to investigate the effects of the provision of digital resources on the professionalisation of university studies in the University of Yaounde I. The regression analysis was used to affirm or refute the relationship between the independent and the dependent variables. The dependent variable was therefore regressed on the independent

variable (IV2). It was found out that the independent variable (provision of digital resources) significantly predict the professionalisation of university studies with $F\text{-statistic} = (1-274) = 44.934$, $p\text{-value} = 0.000$. Also, the $R^2 = 23.9$ depicts that the model explains 47% variance in the professionalisation of university studies. Furthermore, the regression coefficient was assessed to ascertain the effects of the provision of digital resources on professionalisation of university studies. The results revealed that provision of digital resources exerts a positive and influence on the professionalisation of university studies with $B = .342$, $t\text{-statistic} = 1.394$, $p\text{-value} = 0.000$. Based on this, the null hypothesis is rejected and the alternative hypothesis accepted which states that provision of digital resources exerts a significant effect on the professionalisation of university studies in the department of geography in the University of Yaounde I.

Based on the above results, we can conclude that the level of professionalisation in university studies largely depends on the ability of the university authorities to provide digital resources in abundance, in time and in due course. This require them to make sure that the faculty has well qualified staff and ICT personnel supporting the teaching and learning processes. Also, there must be an effective use of the learning management system so as to facilitate the administration, documentation, tracking, and delivery of lectures.

Again, provision of digital resources requires the university authorities to establish well-equip and modern libraries, enhance the daily provision of electricity which will facilitate technology integration in education and enhance lessons delivery. The findings also revealed that there is the need to diversify the sources of finance. Financial capital is said to be indispensable for the success of e-learning project. As such, school authorities are advised to handle this issue with care.

Research objective three

In the third research objective, the researcher wanted to investigate the effects of the availability of trained lecturers on the professionalisation of university studies in the University of Yaounde I. The regression analysis was used to affirm or refute the relationship between the independent and the dependent variables. The dependent variable was therefore regressed on the independent variable (IV3). It was found out that the independent variable (availability of trained lecturers) significantly predict the professionalisation of university studies with $F\text{-statistic} = (1-274) = 28.173$, $p\text{-value} = 0.001$. Also, the $R^2 = 41.9$ depicts that the model explains 41% variance in the professionalisation of university studies. Furthermore, the regression coefficient was assessed to

ascertain the effects of the availability of trained lecturers on professionalisation of university studies. The results revealed that the availability of trained lecturers exerts a positive and influence on the professionalisation of university studies with $B = .632$, $t\text{-statistic} = 1.083$, $p\text{-value} = 0.001$. Based on this, the null hypothesis is rejected and the alternative hypothesis accepted which states that the availability of trained lecturers exerts a significant effect on the professionalisation of university studies in the department of geography in the University of Yaounde I.

It is understood that no matter the level of education, teachers have an important role to play in the achievement of the Sustainable Development Goal number 4 which is quality education and life-long learning opportunities for all. To ensure this, lecturers at the level of the university are required to be equip with modern tools and 21st century skills including ICT integration. The role of the university authorities is therefore to craft out means and ways through which lecturers can be upgraded. Achieving this requires university authorities to organize workshops, seminars and top-up courses to improve on the performance of lecturers in relation to the use of technology in education.

Research objective four

In the fourth research objective, the researcher wanted to investigate the effects of the ICT access on the professionalisation of university studies in the University of Yaounde I. The regression analysis was used to affirm or refute the relationship between the independent and the dependent variables. The dependent variable was therefore regressed on the independent variable (IV4). It was found out that the independent variable (ICT access) significantly predict the professionalisation of university studies with $F\text{-statistic} = (1-274) = 20.449$, $p\text{-value} = 0.002$. Also, the $R^2 = 15.9$ depicts that the model explains 15% variance in the professionalisation of university studies. Furthermore, the regression coefficient was assessed to ascertain the effects of the ICT access on professionalisation of university studies. The results revealed that ICT access exerts a positive and influence on the professionalisation of university studies with $B = .227$, $t\text{-statistic} = 1.670$, $p\text{-value} = 0.002$. Based on this, the null hypothesis is rejected and the alternative hypothesis accepted which states that the ICT access exerts a significant effects on the professionalisation of university studies in the department of geography in the University of Yaounde I.

CHAPTER 5

DISCUSSION OF FINDINGS, SUGGESTIONS PERSPECTIVES, LIMITATIONS AND CONCLUSION

The previous chapter focused on the data analysis, presentation and interpretation of the results. The present chapter thus focuses on the discussions of results, suggestions, perspectives for further studies as well as limitations and conclusion. The discussion of the results is done in respect to the various hypotheses of the study. Here, ICT infrastructural dispositions, provision of digital resources, availability of trained lecturers or better still personnel and ICT access and equity are used to discuss the findings of the study.

Discussions of results

Discussion of results of findings constitutes an important step in a research work. The purpose of carrying discussions of results is to position the findings in line with other findings in the research area. This consists of visualizing whether the results achieved are in convergence or divergence with those of our predecessors. Each hypothesis is used to discuss the results of the findings. Theories are also used to elaborate on the results.

Effects of ICT infrastructural dispositions on professionalisation of university studies

The results of the findings derived from the model summary revealed that the independent variable (ICT infrastructural dispositions) influences the dependent variable (professionalisation of university studies). This implies that ICT infrastructural dispositions has an effects on the professionalisation of university studies in the department of geography. The findings further revealed that that the Analysis of variance (ANOVA) was used to test the significance of the relationship between the IV and the DV. As such, a significant regression equation was obtained. The p-value obtained, indicated that there is a statistically significant relationship between ICT infrastructural dispositions and professionalisation of university studies. The above results mean that ICT infrastructural dispositions is a strong and positive predictor of professionalisation of university studies in the University of Yaoundé I.

Again, the results obtained through the regression analysis model, indicated that ICT infrastructural dispositions has a positive Beta (β) coefficient. According to this regression equation established, ICT infrastructural dispositions at a constant zero (0), professionalisation of

university studies will be positive. This explains a positive slope regression equation. This therefore means that every unit increase in ICT infrastructural dispositions will automatically lead an increase in the professionalisation of university studies. In conclusion, ICT infrastructural dispositions is seen to exert a strong and positive influence on the professionalisation of university studies in the University of Yaoundé I. It was on the basis of this results that the null hypothesis was rejected and the alternative accepted which stipulates that ICT infrastructural dispositions exerts a positive influence on the professionalisation of university studies. These results are in line with those of our predecessors.

Bediang et al. (2013), found out that a major challenge of the university students at the Faculty of Medicine and Biosciences is infrastructure as these students have basic skill in ICT for the reason that these students were part of the internet generation. To these authors, these students “were born when computers and Internet became available throughout the world while the lecturers are from a generation who witnessed the emergence of computers and Internet teaching.” Students now attending primary, secondary, and high schools belong to the digital era.

Thus, for children to exercise their right to education, ICT infrastructure and skills must be developed in the region. Students require access to digital hardware, stable electricity, and reliable Internet. Schools, parents/guardians, and community organisations have a responsibility to support a child’s right to education and to present the challenges that infrastructural limitations present for education in this digital era, but government involvement is critical to bring about long term change the overall stabilisation of ICT infrastructure.

In a research on advancing the digital transformation of higher education in Cameroon, Jeremie and Ru (2023), asserts that technological innovation is rapidly transforming the global business and education landscape. Countries with strong economies give credit to digital innovation, they benefit positive social and cultural changes. Higher education in these countries lay emphasis on digital skills so as to meet up with the demand of the labor market. Therefore, heavy public sector spending on infrastructure is a favorable component to boost economic growth.

Findings by Njebakal and Teneng (2017), to determent the employability and graduate destinations in terms of finding a good paying job as the result of digital technology in the teaching and learning process in Higher education in Cameroon reveals that, students who graduate from the university are likely to swell the ranks of unemployment in the country. It follows that, for a country to ensure

a competitive edge in the global market, universities should accelerate and smooth the shift to the new knowledge-based economies and high-technologies through appropriate and effective linkages between research and the labor market to ensure that their countries have a competitive advantage in the global market.

The above result is supported by the actor-network theory. This theory is based on the assumption that the professionalisation of university studies in the digital age is closely tied to the integration of Information and Communication Technologies (ICTs) within higher education institutions. ICT infrastructure plays a key role in modernizing and professionalizing educational systems, providing students and educators with tools that support skill acquisition, knowledge dissemination, and the creation of professional networks. To understand the dynamics behind the professionalisation of university studies through ICT infrastructure, Actor-Network Theory (ANT) offers a useful theoretical framework. Actor-Network Theory (ANT), developed by Bruno Latour, Michel Callon, and John Law, is centered on understanding how both human and non-human actors (like technology) interact to create networks that shape society, knowledge, and practices.

Effects of the provision of digital resources on the professionalisation of university studies

The results of the findings derived from the model summary revealed that the independent variable (provision of digital resources) influences the dependent variable (professionalisation of university studies). This implies that provision of digital resources has an effect on the professionalisation of university studies in the department of geography. The findings further revealed that the Analysis of variance (ANOVA) was used to test the significance of the relationship between the IV2 and the DV. As such, a significant regression equation was obtained. The p-value obtained, indicated that there is a statistically significant relationship between the provision of digital resources and professionalisation of university studies. The above results means that provision of digital resources is a strong and positive predictor of professionalisation of university studies in the University of Yaounde I.

Again, the results obtained through the regression analysis model, indicated that the provision of digital resources has a positive Beta (β) coefficient. According to this regression equation established, provision of digital resources at a constant zero (0), professionalisation of university studies will be positive. This explains a positive slope regression equation. This therefore means that every unit increase in provision of digital resources will automatically lead an increase in the

professionalisation of university studies. In conclusion, the provision of digital resources is seen to exert a strong and positive influence on the professionalisation of university studies in the University of Yaounde I. It was on the basis of this results that the null hypothesis was rejected and the alternative accepted which stipulates that provision of digital resources exerts a positive influence on the professionalisation of university studies. These results are in line with those of our predecessors.

In a study by Ngafor (2017), found out that universities, including the University of Buea, faced difficulties in maintaining reliable internet access and providing students with the necessary digital resources to fully participate in online learning. The lack of sufficient computers in university libraries and computer labs further limited students' ability to take advantage of ICT tools. Additionally, many faculty members lacked the training required to effectively integrate ICT into their teaching practices.

In a similar study by Mbangwana (2008), revealed that, although Cameroonian universities had made efforts to adopt ICTs, the digital divide between urban and rural students was still a significant issue. Students from rural areas, who often lacked access to reliable internet and digital devices, were at a disadvantage compared to their peers in urban centres. This inequality was exacerbated by the high cost of mobile data, which restricted many students' ability to access online learning platforms.

To address the challenges associated with ICT adoption in higher education, several studies have proposed solutions aimed at improving infrastructure, training, and access to digital resources. Evoh (2007) suggests that governments and educational institutions should invest in improving internet connectivity, particularly in rural areas, and subsidise the cost of digital devices to make them more affordable for students. This explains why Mtebe and Raisamo (2014) argue that universities should provide ongoing professional development for faculty to ensure that they are equipped with the necessary skills to integrate ICT into their teaching. They also recommend that institutions create more robust digital infrastructures, such as Wi-Fi networks and computer labs, to support the growing demand for online learning.

At the University of Buea, Komnkan (2020) recommends that the institution increase its investment in ICT infrastructure, provide more training opportunities for faculty, and work with telecommunication companies to offer affordable internet packages for students. These measures

would help to bridge the digital divide and enhance the overall effectiveness of ICTs in improving student learning outcomes. Case studies from other universities in Africa provide insights into successful ICT implementation strategies.

In a more recent study by Maguatcher Jeremie and Ning Ru (2020) which explores the various dimensions of digital transformation in Cameroon's higher education sector, analyzing the current state, challenges, and opportunities presented by digital technologies. Their work builds on existing literature that emphasizes the importance of adopting digital solutions to enhance educational quality and access. The higher education system in Cameroon faces numerous challenges, including overcrowded institutions, limited resources, and a lack of technological infrastructure. According to Tchombe (2014), these issues hinder the quality of education provided, leading to a mismatch between graduates' skills and labor market demands. This context sets the stage for the need for digital transformation, which can provide alternative pathways for improving educational delivery.

In this context, Maguatcher and Ning Ru (2020) argue that digital transformation can address systemic challenges in Cameroonian higher education. They highlight that digital tools, such as e-learning platforms and online resources, can help overcome geographical barriers and enhance access for students, particularly in rural areas. They identify several key drivers of digital transformation in Cameroon's higher education landscape.

Effects of the availability of trained lecturers on professionalisation of university studies

The results of the findings derived from the model summary revealed that the independent variable (availability of trained lecturers) influences the dependent variable (professionalisation of university studies). This implies that availability of trained lecturers has an effect on the professionalisation of university studies in the department of geography. The findings further revealed that the Analysis of variance (ANOVA) was used to test the significance of the relationship between the IV3 and the DV. As such, a significant regression equation was obtained. The p-value obtained, indicated that there is a statistically significant relationship between the availability of trained lecturers and professionalisation of university studies. The above results mean that availability of trained personnel is a strong and positive predictor of professionalisation of university studies in the University of Yaounde I.

Again, the results obtained through the regression analysis model, indicated that the availability of trained lecturers has a positive Beta (β) coefficient. According to this regression equation established, availability of trained lecturers at a constant zero (0), professionalisation of university studies will be positive. This explains a positive slope regression equation. This therefore means that every unit increase in the availability of trained lecturers will automatically lead to an increase in the professionalisation of university studies. In conclusion, the availability of trained lecturers is seen to exert a strong and positive influence on the professionalisation of university studies in the University of Yaoundé I. It was based on these results that the null hypothesis was rejected and the alternative accepted, which stipulates that the availability of trained lecturers exerts a positive influence on the professionalisation of university studies. These results are in line with those of our predecessors.

The above findings is supported by the Technology Acceptance Model (TAM), proposed by Davis (1989). TAM helps explain how individuals come to accept and use new technologies based on two primary factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). In the context of higher education, especially concerning the professionalisation of university studies, TAM plays a significant role in understanding how students and faculty adopt and utilize ICT tools for academic and professional purposes. Additionally, the availability of ICT technical support can significantly affect the successful implementation and integration of technology in the educational process.

Effects of ICT access and equity on professionalisation of university studies

The results of the findings derived from the model summary revealed that the independent variable (ICT access and equity) influences the dependent variable (professionalisation of university studies). This implies that ICT access and equity has an effect on the professionalisation of university studies in the department of geography. The findings further revealed that that the Analysis of variance (ANOVA) was used to test the significance of the relationship between the IV4 and the DV. As such, a significant regression equation was obtained. The p-value obtained, indicated that there is a statistically significant relationship between the ICT access and equity and professionalisation of university studies. The above results mean that ICT access and equity is a strong and positive predictor of professionalisation of university studies in the University of Yaounde I.

Again, the results obtained through the regression analysis model, indicated that the ICT access and equity has a positive Beta (β) coefficient. According to this regression equation established, ICT access at a constant zero (0), professionalisation of university studies will be positive. This explains a positive slope regression equation. This therefore means that every unit increase in ICT access will automatically lead an increase in the professionalisation of university studies. In conclusion, the ICT access and equity is seen to exert a strong and positive influence on the professionalisation of university studies in the University of Yaounde I. It was on the basis of this results that the null hypothesis was rejected and the alternative accepted which stipulates that ICT access and equity exerts a positive influence on the professionalisation of university studies. These results are in line with those of our predecessors.

The above findings agrees with Ndongfack (2015) who found out that while some universities, particularly those in major cities, have embraced digital technologies, many institutions in rural areas struggle with limited infrastructure, lack of reliable internet, and outdated equipment. These disparities create a digital divide, which limits the potential of ICT to fully enhance educational access across the country.

Access to quality technology support is not evenly distributed across educational institutions. Studies by Dexter et al. (2002) and Bebell and O'Dwyer (2010) suggest that schools with more financial resources, particularly those in urban areas, tend to have better technology infrastructure and support systems than rural or underfunded schools. In wealthier institutions, dedicated IT teams are often available to troubleshoot issues, provide training, and ensure the smooth operation of digital tools.

Warschauer and Matuchniak (2010) found that schools in disadvantaged areas often struggle to provide adequate technology support. The digital divide—both in terms of access to technology and the availability of quality support—means that schools in low-income communities face significant challenges in using technology effectively. These institutions may have outdated equipment, limited bandwidth, or insufficient personnel to provide the necessary support for teachers and students. Hohlfeld et al. (2008) add that in many underfunded schools, technology support is often relegated to teachers who lack the specialized training required to maintain and troubleshoot equipment, further exacerbating inequities in access.

Finally, a similar study carried out by Ngu and Teneng (2020) found out that access the impact of policy implementation on the employability of students. Results from this study emphasized that, educational policies in the education and training of students is poor, and thus falls short of qualifying students for quality jobs. It follows that, equipping education with adequate 21st-century policies and frameworks, curricula, and infrastructure, and the right partnerships will help students inculcate appropriate skills to help learners easily integrate into the global labor market.

This finding is supported by the social capital theory. In today's higher education landscape, Information and Communication Technology (ICT) access is pivotal for student learning, academic success, and professional growth. However, unequal access to ICT resources can deepen social inequities, leaving certain groups disadvantaged. Social Capital Theory (SCT), developed by scholars like Pierre Bourdieu, James Coleman, and Robert Putnam, offers a useful lens to explore how social relationships and networks affect ICT access and equity in education. SCT highlights how students' access to ICT is influenced by their social connections, resources, and networks, which in turn affect their academic and professional success.

Suggestions/Recommendations

The results of the present study reveals that ICT integration is a strong and positive predictor of the professionalisation of university studies in higher education. It is proven that the introduction of ICT tools in higher education go a long way to facilitate graduate employability and socio-professional integration in the society. Based on the above conclusions, a number of suggestions were drawn and directed towards the educational authorities which if they are implemented will go all the way to solve the problem of professionalisation in states universities in Cameroon.

1. The results of the findings of the study reveals that ICT infrastructures remain an indispensable factor in enhancing effective professionalisation of university studies in Cameroon. ICT infrastructures constitutes a key aspect in this process. The growing importance of digital infrastructures due to the role they play have made impossible to think of a digitalize society without the presence of digital infrastructures. For this to be possible, it is suggested that the government, state officials, university authorities, and all the educational stakeholders should take dispositions aim at equipping universities with sophisticated and up-to-date digital facilities capable of facilitating the professionalisation process. This consist of constructing multimedia halls and centers in all the faculties and professional schools attached to the university.

It is also suggested that university authorities should derive measures, strategies, methods, and means through which the digital divide can be bridged in faculties and professional schools. In this respect, amphitheatres, offices and administrative buildings are required to be digitalised. The government of the Republic is hereby advised to invest in the construction of digital infrastructures in state universities across the country. This consists of revising their investment policy and developing ICT policies which will facilitate effective integration of technology in education.

2. The findings of this study reveal that the provision of digital resources constitutes a key factor in determining the level of professionalisation at the university level. It is seen that the provision of digital resources is a positive and strong predictor of the professionalisation of university studies. On this basis, it was therefore suggested that the government, state officials, university authorities, and educational stakeholders should intensify the provision of digital resources to classical faculties and professional schools. This involves providing ICT tools like computers, projectors, digital cameras, smart phones, smart boards, interactive white boards, online libraries, etc. By making these and other teaching and learning materials available, they will go a long way to bridge the digital divide in state universities and enhance the professionalisation of university studies.

3. The findings of the study also reveal that professionalisation of university studies largely depends on the availability of trained personnel. It is proven that individuals (lecturers and administrative personnel) who are skilled in ICT and digital technology will subsequently enhance the professionalisation of university studies. This is so because they are considered as people resources capable of mentoring the students and other staff in digital literacy.

Based on this, it was therefore suggested that the government, state officials, and policy makers should deeply invest in the in-service training of university lecturers in digital literacy. They should make sure that university lecturers are in close contact with digital tools on daily basis. This will help them master the usage of the ICT tools. For this to be possible, we suggest that the government and university authorities should multiply ICT seminars, organize workshops and encourage lecturers and staff to participate in both national and international conferences so far as it has to do with digital technology. Attention should be paid on tutorials and mentorships. By organizing tutorials, lecturers end up equipping themselves in less time and cost. Mentorship is also an ideal

suggestion for university authorities which will consist of placing the less experience staff under the more experience ones for guidance.

4. The results of the findings of this study also proves that ICT access is a key factor which determines the professionalisation of university studies. It is seen that access for all to digital technology can go a long way to enhance professionalisation of university studies thereby solving the problem of graduates' underemployment. Considering the importance of ICT access, it was therefore suggested that the government of the republic, state officials, policy makers and educationists should revise the ICT policy in terms of access across the entire territory. This demands the government to channel its efforts towards widening access to digital technology by making internet connectivity readily available to all and at affordable cost.

Also, it is suggested that the university authorities should make available on university campuses quality and free wireless network connections easily accessible to all students, lecturers and staff. This consist of making sure that there is free internet on the campuses. To bridge the digital divide, we also see the need for the government to provide electricity on daily basis in the campuses.

It is understood that by providing ICT infrastructural dispositions, providing digital resources on time and in due course, training lecturers and personnel through mentorships, tutorials, workshops, seminars and conferences and bridging digital divide by widening access to digital technology through free wireless internet, quality internet connectivity and constant provision of electricity, will go a long way to address the issue of professionalisation of university studies as well as tackle the problem of graduates underemployment.

Perspectives for further studies

It is understood that ICT and technology integration occupies an important place in the society, especially in the 21st century where the UNO intends to transform the world in to a global village. Rechanneling research works towards the integration of ICT and technology in education is seen as a laudable initiative. This is because the importance of integrating ICT in education is not over emphasized. As such, the present study addresses the impact of ICT integration on the professionalisation of university studies with evidence from the geography department of the University of Yaounde I. Future studies can be envisaged on the following topics.

1. A comparative study can be carried out to investigate the level of ICT integration in the respective faculties and professional schools of the University of Yaounde I.
2. Another study can be carried out in other universities across the country to measure the state of ICT integration and how it affects professionalisation.
3. A third study can be conducted using a mixed research approach since the present study only make use of the quantitative approach to study the phenomenon.

Constraints/Difficulties

Scientific research is considered to be a wonderful experience which is not free from constraints and loopholes. Constraints and difficulties are part and parcel of research. This is because carrying out research work is considered to be a challenging task, especially for novice researchers and thus requires a lot of perseverance, optimism, patience, determination and abnegation. The researcher was faced with several challenges of varying nature, ranging from administrative bottlenecks, accessibility of the participants, language and return rate of the questionnaire.

Talking of an administrative bottleneck, the process of data collection was not an easy one. The researcher had to seek the authorisation from the head of the geography department. This took more time than expected, thereby delaying the research process and the time frame for the realisation of the research project. Also, some categories of the participants (lecturers and personnel) were not easily accessible. Most of them complain of busy schedules making it impossible for them to attend to us on time. Besides, the return rate of the questionnaire also proves to be an issue, as not all the questionnaires sent out came back. This complicated the data collection process as the researcher had to reprint the questionnaire on several occasions to make sure that the sample size was met. All this proves to be very challenging to the researcher and might have affected the quality of the results.

CONCLUSION

Education is seen as the basis for economic growth and development in both developed and less developed countries. The world is affected by a wind of change which is the influence of ICT and digital technology in the society. The survival of nations in the 21st century requires the integration of ICT and digital technology in all the aspect of the social life including education. The integration of ICT and digital technology in education is seen as a wonderful solution to numerous problems and challenges affecting the teaching and learning process. It is understood that the integration of ICT in education is the turning point in the professional of university studies. This is as a result of the important role of ICT in the modern day's society.

The present study seeks to investigate the impact of Information and Communication Technologies (ICT) integration on the professionalisation of university studies in the geography department in the University of Yaoundé I. the question of professionalisation is becoming even more visible in higher education. National and international conferences is directed towards finding lasting solutions to the problem of professionalisation and graduates employability. The work is divided into five broad chapters. Chapter one addressed the backgrounds, problem statement, objectives, questions, hypotheses including the significance of the study. Chapter two centered on the review of literature, which is divided into conceptual, theoretical and empirical review of literature. The chapter ended with the identification of the research gap. Chapter three addressed the research methodology, including the research design, population, sample size, and sampling techniques, as well as the instruments of data collection and methods of data analysis. Chapter four focused on the analysis, presentation and interpretation of both the descriptive and inferential statistics results. Chapter five focused on the discussion of findings, including, suggestions, perspectives for further studies and limitations.

In addressing the problem of professionalisation of university studies, the researcher adopted a descriptive research survey based on the quantitative research approach. The study was conducted at the University of Yaoundé I, precisely in the department of geography. Regarding the population of the study, both teachers, students and staff participated in the study. A sample size of 276 participants was purposefully selected for the study. Data was collected from the participants using a close ended questionnaire. The collected data was analyzed using the statistical data analysis

techniques precisely the descriptive and inferential statistics. Hypotheses verification was done using the simple linear regression analysis. The data analysed reveal the following results.

In hypothesis one, it was proven that Information and Communication Technologies (ICT) infrastructural dispositions exert a positive and strong influence on the professionalisation of university studies, as a significant ANOVA value was obtained. In hypothesis two, the findings revealed that the provision of digital resources is a strong determinant of the professionalisation of university studies, with a significant F-statistic obtained. In the third hypothesis, the findings revealed that the availability of trained lecturers significantly affects the professionalisation of university studies. Lastly, in the fourth hypothesis, the results revealed that Information and Communication Technologies (ICT) access is a strong and positive predictor of the professionalisation of university studies, with a significant F-statistic value obtained. This, therefore, means that the integration of Information and Communication Technologies (ICT) in education significantly affects the professionalisation of university studies in the geography department of the University of Yaoundé I.

Based on the above findings, it was thus suggested that the government, state officials, policy makers, educationists and stakeholders should revitalise existing policies in relation to infrastructures in school campuses. Also, it was suggested that digital resources such as computers, projectors, whiteboards and smart boards should be provided on time. Again, it was suggested that individuals should be trained on the use of Information and Communication Technologies (ICT) and digital technology through tutorials, mentorships, seminars, workshops and conferences and finally bridging the digital divide in education by widening access to Information and Communication Technologies (ICT) through quality internet connectivity, free wireless networks, and constant electrification of university campuses. This will go a long way to ameliorate the rate of Information and Communication Technologies (ICT) integration in education, as well as solve the problem of the professionalisation of university studies. Further studies can be conducted on a comparative analysis of the state of Information and Communication Technologies (ICT) integration in classical faculties and professional schools in Cameroon. A mixed research can also be undertaken to investigate the effects of Information and Communication Technologies (ICT) integration on the professionalisation of university studies.

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APPENDIXES

Appendix 2: Questionnaire

REPUBLIQUE DU CAMEROUN
Paix – Travail - Patrie

UNIVERSITE DE YAOUNDE I

FACULTE DES SCIENCES DE L'EDUCATION

DEPARTEMENT DE CURRICULA ET EVALUATION



REPUBLIC OF CAMEROON
Peace – Work - Fatherland

UNIVERSITY OF YAOUNDE I

THE FACULTY OF EDUCATION

DEPARTEMENT OF CURRICULUM AND EVALUATION

Research Questionnaire

Dear respondents,

I am a Master's student in the University of Yaounde I, Faculty of Education and in the department of Curriculum and Evaluation. I am conducting a study on the following topic “**ICT Integration in Higher Education and the Professionalization of University Studies**”. This study seeks to evaluate the extent to which ICTs integration in higher education influences the Professionalization of University Studies in Yaoundé 1. You are hereby guarantee that the information provided will be handled diligently and will remain confidential with the researcher. You are also reminded that your identity will not be disclose. You are free to participate or not in the survey. Dear respondents kindly tick the box which correspond to your level of agreement or disagreement with the statement. **Instructions: SA = Strongly Agree, A = Agree, D = Disagree and SD = Strongly Disagree.**

ICT infrastructural dispositions

CZ	No	Item	SA	A	D	SD
	1	The Geography department has a well-equipped multimedia hall with latest generation computers.				
	2	Internet connection is fast when downloading videos, streaming lectures, and downloading large research papers.				
	3	There is an operational multimedia center to meet the needs of students and faculty members.				
	4	The department has Internet connectivity, and Wi-Fi networks with high speed supporting access to digital resources.				
	5	The department has sufficient interactive tools such as projectors, and smartboards, whiteboard, microphones to facilitate learning.				

Provision of digital resources

CZ	No	Item	SA	A	D	SD
	6	The faculty has qualified ICT personnel to support teaching and learning activities.				
	7	The department operates with the Learning Management System to facilitate the administration, documentation, tracking, reporting, and delivery of educational courses or training programs.				

	8	Your department has a well-equipped digital library accessible to all students				
	9	Electricity is provided daily in your school.				
	10	Your school possesses sufficient finances to ensure the effectiveness of distance learning.				

Availability of ICT trained lecturers

CZ	No	Item	SA	A	D	SD
	11	Lecturers effectively integrate ICT tools into their teaching practices.				
	12	ICT training for lecturers is regularly updated to keep pace with technological advancements.				
	13	Lecturers receive ongoing professional development related to ICT use in their teaching.				
	14	Trained personnel are available to assist students with technology-related issues (e.g., accessing online resources).				
	15	Lecturers are confident in using ICT resources to enhance student engagement and learning outcomes.				

ICT access and equity

CZ	No	Item	S A	A	D	S D
	16	All students have equal access to ICT resources (e.g., computers, software, internet) in the university.				
	17	There are no significant disparities in ICT access between different faculties or departments at the university.				
	18	Students with disabilities have appropriate access to ICT resources necessary for their studies.				
	19	The university ensures that ICT facilities are available to all students outside regular class hours.				
	20	There are programs to support underrepresented groups (e.g., women, minorities) in accessing ICT resources.				

ICT access and equity

CZ	No	Item	S A	A	D	S D
	16	The university provides opportunities for students to engage in ICT-related projects or internships in companies.				
	17	The university offers workshops and seminars on the use of ICT for career readiness.				
	18	I have access to mentors or advisors who help me integrate ICT into my professional pathway.				
	19	My courses encourage the development of ICT skills that are applicable in real-world job environments.				
	20	I feel confident in using ICT resources to enhance my academic and professional skills.				

Socio-demographic information

21. Gender: Male ☐ Female ☐

22. Age: 10-20years ☐ 21-30 years ☐ 31-40 years ☐ 41-50 years ☐ 50 and above ☐

23. Status: Teacher ☐ Student ☐

24. Level of education: Bachelor's degree ☐ Master's de ☐ PhD ☐ Others ☐

Thanks for your collaboration!!!!!!