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Digitalization of Teaching in Government Teacher Training Colleges in Cameroon: Modes of Appropriation and Constraints

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Abstract

With the proliferation of ICTs in the domain of education and the effects of the socio-political turmoil of 2016 and the covid-19 pandemic, the various ministries of education in Cameroon called for intensification of innovative teaching strategies. This illuminated the need for digitalization of teaching. Experience however showed this call took most teachers of Government Teacher Training Colleges by surprise based on the fact that most teacher trainers still limited their teaching to the chalk and talk methods. This survey therefore sought to investigate the various ways by which teacher trainers acquire knowledge and skills in digitalizing teaching and the constraints faced in effectively implementing digitalization in pedagogy. The purposive sampling technique was used to select 200 teacher trainers from HTTC, GBTTC Bamenda, GTTC Fundong, GTTC Wum, GTTC Nkambe, GTTC Mbengwi, GTTC Ndop and GTTC Kumbo. Self-designed questionnaire was used to collect data which were analysed using descriptive statistics on SPSS 20.0. Findings indicated that a majority of teacher trainers (95%) had some knowledge on what digitalization is all about and that digitalization of teaching was introduced while they were still in the training college (82.5%). It also showed that most of them (62%) had received training on how to use digital facilities in teaching while in training college. Also, a Majority (82.5%) affirmed that they had been attending conferences and seminars on how to integrate digital devices although most of these seminars they attended were not organized by the teacher training colleges where they teach. Also, a majority (88.5%) made personal effort to read literature on the integration of digital facilities to improve on their knowledge in the domain. The findings indicated that most teacher trainers could not effectively digitalize their lessons due to unstable internet connection (82.5%), irregular electricity supply (80.5%), insufficient administrative support (78.5%), insufficient finance to acquire digital devices (79%), insufficient knowledge and skill in operating (75%) and integrating (74%) digital devices. The study suggested that

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training on digitalization of teaching be intensified during pre-service training as well as regional and school-based seminars for in-service teachers. There should be regular pedagogic supervision by regional and divisional pedagogic inspectors for follow-up. Also, ICT infrastructure, solar energy and internet be made readily available in Government Teacher Training Colleges.

Keywords: *Digitalization of teaching, teacher training colleges, constraints.*

Introduction

Recent advancements in technology and their imminent feature of adaptability have increasingly made their integration in facilitating teaching and learning inevitable in most educational institutions around the world. The fact that these facilities are adaptable, the fact that they influence variation in teaching methods and techniques, influence variability in modes of presenting content and evaluating learning, makes them very useful aids in the hands of trained and committed teachers in this era of inclusive education that calls for differentiated teaching strategies. With the adverse toll of the socio-political turmoil in 2016 and the unexpected Covid-19 pandemic in 2019, the Ministries of Basic and Secondary Education in Cameroon called for the intensification of digitalization in teaching so as to bridge the gaps (Béché 756). This move saw a series of seminars conducted at the Regional and some Divisional Delegations of Secondary Education in the North West Region under the theme "Alternative Pedagogic Methods in Post Covid-19 Era- Digitalization of Education and Distance Learning" (Regional Delegation of Secondary Education for the North West 2022 reports). This required shift in pedagogic strategies became important as it raised strategic concerns on whether teacher trainers were effectively trained to adjust to the needs of this new dispensation. It is based on this perceived gap that this paper sought to investigate the various ways by which teacher trainers of Government teacher Training Colleges acquire knowledge and skills on digitalization of teaching and the challenges faced in its implementation.

Background and Literature

Arisoy defines digitalization in education as using digital technology to teach students (1800). It is the integration of Information and Communication Technologies (ICTs) to enhance lesson planning, presentation, follow-up and evaluation of learners. Previous research validates that the quality of learning depends on how ICT is used (Meisalo Veijo, et al. 7). The Cameroonian government therefore has put in place a strategy of conceiving and implementing efficient and reliable programs in all state sectors, inscribed in the *National Development Strategy on Information and Communication Technologies* (National Agency for the Development of Information and Communication Technology-ANTIC, 2). This policy document, prefaced by Paul Biya, the President of the Republic of Cameroon, marks an undoubted indication that the state prioritizes the integration of ICTs in all spheres of political, economic, cultural, social and educational life. It is on this premise that the 2013 revised syllabus for teacher training colleges in Cameroon requires teachers to be trained on the integration of ICTs in pedagogy through subjects like ICT and Didactics of Educational Technologies respectively. However, these courses are mostly taught theoretically, leaving pre-service teachers ill-prepared to integrate these facilities to effectively teach the respective courses or subjects. Experience shows that this lack of practical approach is due in part to lack of sufficient knowledge and skill on the part of the teacher trainers themselves as well as insufficient ICT infrastructure. This state of affairs goes contrary to the view of Ahmed and Kazmi that the success of any educational and instructional reform is directly dependent on the strength and quality of teacher training institutions of the country (64). With the call for digitalization of teaching and learning, most teachers find it hard to adopt these ICT facilities to teach without the requisite knowledge and skills. Based on this lacuna, Béché affirm that although some teachers used WhatsApp group discussions, Google accounts and online tutoring applications to teach at the inception of the COVID-19 pandemic within the framework of an institution, in 95% of cases, these tools were implemented on the individual initiative of teachers familiar with these new technologies, particularly computer science teachers (761). This means that teachers handling other subjects who were not verse with the use of these devices in teaching avoided them. Pavan contends that the Curriculum for teacher training should address the salient needs of a practicing teacher (49). He/she must have a positive attitude towards Information and Communication Technology; ability to promote ethical and legal behavior in the use of ICT for school and home use; ability to meet all basic hardware knowledge and use requirements specified in the classroom; ability to apply technology tools to solve a variety of problems for teaching and learning with technology; ability to make decisions regarding the use of specific technologies based on empirical research on learning effectiveness. He thus prescribes that pre-service training should build in teachers basic computer skills such as keyboarding, word-processing, creating database, drawing, graphs and pie chart as well as using a spread sheet, presentation software and hardware. They also need statistical analysis skills such as basic knowledge of using Authoring Tool for creation of interactive lessons in multimedia; accessing and downloading items from the internet and familiarity with e-mail. That is, accessing, uploading, downloading and sending (Pavan 51).

Amidst efforts made to encourage digitalization of teaching and learning, the theme of the 2023-2024 academic year selected by the Ministry of Secondary Education (MINESEC) in Cameroon was "Digitalization and classroom practice for the modernization of teaching and learning at the Ministry of Secondary Education" (1). Also, the theme for the 2023 National Day of Bilingualism was "Bilingualism: vector of digitalization of education and the promotion of civic and moral values for a peaceful and emerging Cameroon (MINESEC 1). Such policy intentions demonstrate the commitment of the Ministry in the digitalization of teaching and learning. It was therefore salient to investigate the various ways teacher trainers acquired knowledge and skills to implement this teaching strategy and the hurdles faced.

Constraints against Effective Implementation of Digitalization

Haji Abdoulai, et al. surveyed 320 teachers from 16 secondary schools in Cameroon to determine their perceptions on ICT usage, access, and implementation in schools (147). The study found that the use of ICT was limited due to low confidence and low competencies of the teachers and formal opposition by teachers to use pedagogical tools that they were not initially trained to utilise

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in a professional way. The study also determined that schools were unevenly equipped with ICT. Similarly, Farinkia and Tambi surveyed 186 Form Four students and 13 teachers from Government general education schools in the Fako Division in Southwest Cameroon, with the goal of determining what limits ICT implementation in secondary schools (137). For this analysis, government schools were selected as they already had ICT in their facilities, typically computer laboratories. The study determined seven factors that hindered ICT implementation in schools within the region: in order of descending frequency these were: inadequate number of computers, unreliable internet connectivity, absence of trained support personnel, shortage of teachers to teach computer studies, lack of accessories such as uninterrupted power supply units, frequent interruption of electricity supply and unsupportive rules and regulations. Farinkia and Tambi adds that low usage of ICTs among teachers was linked to lack of ICT familiarity, training, and support for teachers and to an insufficient number of computers for student or teacher use (153). Crocket Janelle, et al. support the view that infrastructural limitations, particularly with lack or limited electricity supply in rural areas, further hindered the implementation of ICT in Cameroon schools (2).

On his part, Teke writing on the digitalization of learning contents in Cameroon contend that technology initiatives often face challenges relating to infrastructure, staff capacity, limited access to professional networks, sever resource constraints and until very recently exorbitantly expensive and highly unreliable bandwidth and the rapid pace of technological change (74). Teacher's knowledge and skills in the integration of ICTs still remains low especially among teacher trainers in Cameroon. The International Telecommunication Union (ITU) asserts that less than 15% of Cameroonians command basic digital skills (5). It was therefore worthwhile to investigate the various ways teacher trainers obtain knowledge and skills and the challenges they face in their effort to digitalize teaching.

Research Questions

1. What are the various ways by which teacher trainers in Government teacher training colleges in the North West Region acquire knowledge and skills in digitalization of teaching?
2. What are the constraints faced by teacher trainers in Government teacher training colleges in the North West Region encounter in digitalizing teaching?

Theoretical Perspective

TPACK Model

The Technology, Pedagogy and Content Knowledge Model (TPACK) illustrates ICT integration in an educational milieu, and more specifically, within the curriculum (Koehler ande Mishra 132). This entails three types of knowledge bases that teachers require: technological, pedagogical and content knowledge. TPACK is one of the main theoretical models widely adopted by researchers for examining and developing pre-service and in-service teachers' knowledge regarding the integration of technology into teaching (Martin 1776; Pamuk 425). The model emphasize that teachers need to have a blend of the three knowledge bases (technological, pedagogical and content knowledge bases) to be efficient in integrating ICTs in pedagogy. This model can predict teachers' ability to effectively cope with challenges of 21st-century teaching and learning presented by ongoing digitalization of teaching and learning (Foulger Teresa, et al. 413). However, teachers also encounter organizational challenges that are less emphasized in the TPACK model.

The RIPPLES Model

The RIPPLES Model (resources, infrastructure, people, policies, learning, evaluation, and support) propounded by Surry presents seven required components for best ICT implementation in educational milieu (8). The seven factors affecting ICT implementation are related to organizational aspects on the one hand, and to technological aspects on the other hand, thereby adding value to the TPACK model. The model elaborates seven required components for best ICT implementation: a) Resources and financial planning, including allocation of resources for ICT implementation; b) Infrastructure development, including planning of robust means of ensuring ICT as a major player for teacher education; c) People factor, including faculty motivation to implement ICT (such as beliefs, attitudes and values); d) Policy that addresses vision and ICT implementation plan for wide dissemination of ICT-based initiatives; e) Learning power of technology-based education within the curriculum, turning it into an innovative and creative means of preparing future teachers; f) Evaluation of the effect of technology on learning outcomes, like research-based decision-making and planning of ICT implementation; g) Support and encouragement of faculty in terms of technical and pedagogic support, which may include several types of incentives for implementing innovative ICT utilization aimed to create novel modes of training (Ensminger, 5). These factors are a vital component regarding factors that facilitate or hinder ICT implementation among teacher trainers.

Methods and Procedure

The descriptive cross-sectional survey research design was adopted for this study. A sample of 200 teacher trainers from eight public teacher training colleges in the North West Region was selected using purposive sampling techniques (HTTC, GBTTC Bamenda, GTTC Fundong, GTTC Wum, GTTC Nkambe, GTTC Mbengwi, GTTC Ndop and GTTC Kumbo). A semi-structured, self-designed questionnaire with twelve items was used to collect data that were analysed descriptively using SPPS 20.0. Item 12(g) that required respondent's views was analyzed using thematic content analysis. The researchers used three weeks to administer the questionnaires with the help of research assistants. In some instances, the direct delivery method was used while in others, the indirect delivery method was used with teacher trainers urged to complete the questionnaire and return the next day. Ethical considerations required for such research were observed. A pilot study was conducted using 30 teacher trainers from two private teacher training colleges in the North West Region to ensure reliability and validity of the instrument. The return rate of the questionnaires was 100%.

Table 1: Distribution of Teacher Trainers According to Schools

Schools	Frequency	Percentage
Government Teacher Training College (GTTC) Ndop	23	11.5%
Government Teacher Training College Mbengwi	31	15.5%
Government Teacher training College (GTTC) Kumbo	14	7%

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Government Teacher Training College (GTTC) Wum	12	6%
Government Teacher Training College (GTTC) Fundong	12	6%
Government Teacher training College (GTTC) Nkambe	13	6.5%
Government Bilingual Teacher training College (GBTTC) Bamenda	58	29
Higher Teacher Training College (HTTC) Bamenda	37	18.5%

Source: Field Survey (2024)

Table 2: Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	120	60%
Female	80	40%

Source: Field Survey (2024)

Table 3: Distribution of Respondents by Longevity in Service

Longevity	Frequency	Percentage
0-10yrs	89	44.5%
10-20yrs	63	31.5%
21-30yrs	29	14.5%
31yrs and above	19	9.5%

Source: Field Survey (2024)

Table 4: Distribution of Respondents by Qualification

Qualification	Frequency	Percentage
DIPES II	42	21%
DIPES I	7	3.5%
DIPEN I	1	0.5%
DIPEN II	97	48.5%
Master's Degree	13	6.5%
PHD	38	19.0%
DIPCO	2	1.0%

Source: Field Survey (2024)

Findings

The findings have been presented according to the respective research questions

Research Question One: What are the various ways by which teacher trainers in Government teacher training colleges in the North West Region acquire knowledge and skills in digitalization of teaching?

Table 5: Mode of Acquisition of Knowledge and Skills on Digitalization by Teacher Trainers.

Items	Disagree	Neutral	Agree
I have some knowledge on what digitalization is all about	9	1	190
	4.5%	0.5%	95.0%
Digitalization of teaching was introduced when I was in the teacher training college	34	1	165
	17.0%	0.5%	82.5%
I was trained on how to use digital facilities in teaching when I was in the training school	71	5	124
	35.5%	2.5%	62.0%
I have been attending conferences and seminars on how to integrate digital facilities in teaching	29	6	165
	14.5%	3.0%	82.5%
My school organizes seminars/workshops to enhance our knowledge and skills on the use of digital facilities in the teaching-learning process.	119	12	69
	59.5%	6.0%	34.5%
I read literature on the integration of digital facilities to improve on my knowledge	18	5	177
	9.0%	2.5%	88.5%

Source: Field Survey (2024)

Table 5 indicates that majority of the teacher trainers (190 representing 95%) agreed having some knowledge on what digitalization is all about while 9 teacher trainers (4.9%) disagreed and 1(0.5%) was neutral. Also, a majority of 165 (82.5%) teacher trainers agreed that digitalization of teaching was introduced while they were in teacher training college while 34 (17.0) disagreed and 1(0.5%) was neutral. On whether they were trained on how to use digital facilities to teach while in training college, 124 (62%) agreed while 71(35.5%) disagreed and 5(2.5%) were neutral. Out of the 200 respondents, 165(82.5%) agreed that they have been attending conferences and seminars on how to integrate digital facilities in teaching while 29(14.5%) disagreed and 6(3%) were neutral. Furthermore, a majority of 119(59.5%) disagreed that their school have been organizing seminars and workshops to enhance their knowledge and skills on the use of digital facilities in the teaching-learning process while 69(34.5%) agreed and 12(6%) were neutral. Finally, a majority of 177(88.5%) teacher trainers agreed that they read literature on the integration of digital facilities to improve on their knowledge whereas 18(9.0%) disagreed and 5(2.5%) were neutral.

Research Question Two: What are the constraints faced by teacher trainers in Government teacher training colleges in the North West Region encounter in digitalizing teaching?

All the 200 respondents indicated that they face different challenges in integrating digital devices in teaching.

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Table 6: Constraints Teacher Trainers Face in Using Digital Facilities in Teaching

Items	Frequency	Percentage
Insufficient knowledge and skill in integrating digital facilities	148	74%
Irregular electricity supply	161	80.5%
Unstable internet connection	165	82.5%
Insufficient Administrative support	157	78.5%
Insufficient finance to acquire digital devices	158	79%
Insufficient Knowledge and skill in operating digital devices	150	75%
Other Constraints		
Scarcity of digital gadgets in schools	12	6%
Students not being versed with the digital world	3	1.5%
Frequent break down of digital devices	1	0.5%
Lack of Willingness of learners to learn	3	1.5%
Insufficient time for constant practice for mastery	1	0.5%

Source: Field Survey (2024)

Table 6 indicates that a majority of 148 teacher trainers representing 74% said they had insufficient knowledge and skills in integrating digital facilities in teaching. Also, 161(80%) teacher trainers blamed irregular electricity supply while 165(82.5%) said unstable internet supply hindered them from integrating digital facilities to teach. furthermore, 157(78.5%) complained of insufficient administrative support, while 158(79%) blamed their inability to insufficient finance to acquire digital devices. More still, 150(75%) teacher trainers complained of insufficient knowledge and skill in operating digital devices.

Furthermore, giving their opinions on other challenges they faced in integrating digital devices in teaching, 12(6%) teacher trainers complained of scarcity of digital gadgets in school, while 3(1.5%) said students were not verse with the digital world. Also, 1(0.5%) teacher talked of frequent breakdown of digital devices while 3(1.5%) mentioned unwillingness of learners to learn. Finally, 1(0.5%) teacher trainer blamed infrequent use of digital devices to facilitate teaching and learning on insufficient time to do constant practice in order to master the skills.

Discussion

Findings indicated that a majority of teacher trainers had some knowledge on what digitalization is all about and that digitalization of teaching was introduced while they were still in the training college. Also, most of them received training on how to use digital facilities in teaching while in training college. This is the view of Pavan who opines that teacher education programs can be major catalysts for educational reform by preparing pre-service and in-service teachers to effectively use ICTs in classroom through specialized pre-service courses and in-service training (51). To him, teacher education must model the integration of ICT throughout the teacher education program. Such training is in line with Koehler and Mishra (2005) who affirm in the TPACK Model that teachers need a blend of technological, pedagogical and content knowledge to effectively integrate ICTs in pedagogy. That is why Pavan contends that the Curriculum for teacher training should address the salient needs of a practicing teacher (49). Even though a majority affirmed that they have been attending conferences and seminars on how to integrate digital devices, most of these seminars they attended were sadly not being organized by the teacher training colleges where they teach but occasionally by the regional and divisional delegations of secondary education. This indicates a gap that the respective school administration does not make sufficient effort to organize seminars and workshops within the schools to enhance skill acquisition as required. This lack is probably what pushed a majority of teacher trainers to make personal effort to read literature on the integration of digital facilities to improve on their knowledge in the domain as findings indicated. This is a laudable initiative as Chowdhury posit that if teacher educators do not know about ICTs, they are likely going to inadequately prepare prospective teachers (78). Such personal initiatives are very necessary given that less than 15% of Cameroonians command basic digital skills as surveyed by the International Telecommunication Union (2019).

As far constraints are concerned, the findings indicated that most teacher trainers could not effectively digitalize their lessons due to unstable internet connection, irregular electricity supply, insufficient administrative support, insufficient finance to acquire digital devices, insufficient knowledge and skill in operating and integrating digital devices. These constrains are similar to the findings of Crocket Janelle, et al. (2) as well as Teke (74) who contend that limited digital infrastructure, unreliable internet and electricity supply, high financial costs, and limited digital skills amongst teachers and the school workforce hinders the full realization and utilization of digital tools in learning and teaching in the South West region of Cameroon. It is also in congruence with Haji Abdoulai, et al. who found that schools in Cameroon were unevenly equipped with ICT, making digitalization of teaching and learning difficult (147). Similarly, the RIPPLES Model (Surry 8) as cited by Ensminger (5) holds among its seven required components for best ICT implementation that resources and financial planning, including allocation of resources for ICT implementation, Infrastructure development, support and encouragement of the institution in terms of technical and pedagogic support, are vital for digitalization of teaching.

Conclusion and Recommendations

Digitalization of teaching and learning has come to enhance effective teaching and learning in teacher training colleges. This study sought to investigate the modes of appropriation of knowledge and skills for effective digitalization of teaching and to examine the constraints teacher trainers face in embracing this innovation. The findings indicated that teacher trainers already have some knowledge and skills in this domain as it was introduced while they were still in teacher training college. Some have also been attending seminars and workshop to enhance their skills on digitalization of teaching. However, most of these seminars were not being organized within the schools where they serve. Also, irregular electricity and internet supply, lack of ICT

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infrastructure, insufficient administrative support, insufficient finance to acquire digital facilities were among the recurrent challenges that hindered effective digitalization of teaching in teacher training colleges. The study therefore recommends that training on digitalization of teaching be intensified during pre-service training. Also, regional and school-based seminars for in-service teachers should be intensified. Also, there should be regular pedagogic supervision sessions by regional and divisional pedagogic inspectors for follow-up. Also, ICT infrastructure (computers, projectors), stable internet with broad band and solar energy be made readily available in Government Teacher training Colleges. Finally, school administrators should encourage teacher trainers to digitalize their teaching as constant practice will enhance proficiency.

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