Instructors' Techno-pedagogical Predisposition and Quality Higher Education in Cameroon

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Abstract: **This study seeks to illustrate the influence that instructors' techno-pedagogical predisposition exerts on the ongoing quest for quality higher education in Cameroon. It stems from the premise that despite the efforts deployed for modern technologies to be adequately integrated, and effectively used in the pedagogical process within the higher education arena, the teaching staff is not yet aligning in great numbers with this new dawn. The question that is on every lip is, why instructors' apathy on the adoption of technological innovations in the pedagogical process? The blame from literature review is largely laid on access to technological devices, and users' technological skills. This study is a correlational survey involving the random sampling technique, based on Krejcie, and Morgan's (1970) model for the selection of 213 instructors from five higher educational institutions in Cameroon. Data were collected via questionnaire administration, and analysis / interpretations were done with the help of SPSS according to Spearman's Correlation Index. Findings show that instructors' access to techno-pedagogical devices does not significantly affect the quality of higher education whereas their training and initiatives in techno-pedagogy have a significant influence on the quality of higher education in Cameroon. This is illustrated in the overall P-value of <0.05 obtained; hence, the need for remedial measures to be taken.**

***Keywords*: Instructor, Techno-pedagogy, Predisposition, Quality, and Higher education.**

I. INTRODUCTION

Ensuring quality higher education is the foundation for improving people's lives, and sustainable development. Quality improvement and assurance are said to be among the most complicated problems faced by higher education because their impact goes on almost every aspect of the system. For the past decades, the issue of quality higher education has been more and more linked to the use of modern technologies in the teaching-learning process. This explains why the World Declaration on *Education for All* (UNESCO, 2000) and the Sustainable Development Goals (SDGs, 2015) inter-alia were very emphatic about the necessity of providing education for all children, youth, and adults responsive to their needs, and relevant to their lives. This paved the way for the issue of quality, expressed in terms of needs-based criteria.

Technology can be defined as the study of tools, machines, procedures, and methods applied in diverse artistic and industrial branches or a set of coherent knowledge, and practices in a given domain that is based on scientific principles (Apongnde, 2019b). Pedagogy on its part is any activity that is deployed by a person to develop precise learning in an individual (Raynal & Rieunier, 1997). It can also be considered as a discipline that deals with the theory, and practice of teaching, and how these influence students' learning. Techno-pedagogy as used in this context is the act of integrating technology in the process of knowledge transmission while techno-pedagogical predisposition has to do with users' tendency to adopt innovative techniques in the teaching-learning process. Quality is *compliance with standards* (Sefer, & al., 2017) and quality higher education can be referred to education delivered at the tertiary level that meets expected and generally acceptable standards. In other words, it is education that is not acquired for its sake, but for the purpose which it is intended in terms of accreditation, productivity, employability, and usefulness to the society.

Even though quality in higher education and determining the way to measure it is not an easy task (Parri, 2006), it is worthwhile pointing out that every higher educational institution is only as good as the predilection of its teaching staff to adopt the techno-pedagogical culture. It is true that we cannot yet completely do away with onsite in favour of online course delivery in the context of Cameroon; but traditional pedagogy that is technologically supported is certainly a possibility. A glance at the education sector in Cameroon in general, and higher institutions of learning in particular however leaves one with the impression that someone somewhere is not doing his/her job the way it is supposed to be done. In fact, for the past decades, and even nowadays with the advent of the Corona virus (COVID-19) pandemic with its consequential impact on onsite course delivery, especially on tertiary education in Cameroon, the teaching staff of these institutions that are renowned for grappling with a great populace in terms of the student population is still very much attached to the use of traditional methods of knowledge transmission. Very few instructors care about the necessity to effectively use technological innovations of the hour in the pedagogical process. This has been going on, and is still a routine with most instructors.

In effect, the quality of education that students receive at the end of the day needs much to be desired. This explains why graduates from the said institutions have for some time now been facing serious problems integrating themselves into today's technologically challenging socio-professional World. Recognition of the requirements for instructors' predisposition to adopt techno-pedagogy as a key

catalyst of quality improvement, and assurance in higher education is thus imperative. This study falls within the ambit of *Information, and Communication Technology (ICT) in Education*, specifically *Instructional Technology*. The main objective is to determine the degree at which instructors' techno-pedagogical predisposition influences quality higher education in Cameroon.

On a specific note, emphasis is laid on:

Determining the extent to which instructors' access to techno-pedagogical devices affects quality higher education;

Examining the degree at which instructors' level of training influences quality higher education; and

Determining the level at which instructors' initiatives in the use of technology in knowledge transmission affects quality higher education.

In the sections that follow, attention is focused on the context of the study, methodology, and tools, the review of related literature, presentation of results, and discussion of findings, and finally, conclusion, and recommendations.

II. CONTEXT

The quest for quality higher education in African higher education goes back to the founding of the first universities in Africa (UNESCO, 2011). Even though, Cameroon higher institutions of learning were created a few decades later, the guarantee of quality higher education has always been one of its major objectives. This explains why the role of State authorities over higher education has witnessed an increase since independence. Paradoxically, the increased role of the State in university education has always coincided with a decline in the quality of higher education. The rapid growth in university students' enrollments since the late 1980s has been posing additional problems. For instance, by the year 2020, the gross school/university enrollment rates in Cameroon were the highest in the Central African sub-Region, with higher education being 14.3% (UIS, 2020). While the annual enrollment growth rate has been increasing, average public expenditures per student in higher education have also been falling tremendously during this period with tremendous effects on quality. At the same time, unemployment is growing among university graduates. Indeed, the decline in university quality is such that graduates increasingly have trouble obtaining employment even when jobs are available.

The need to seek new mechanisms to improve quality to stem the decline in the quality of higher education therefore becomes rife among higher education communities, and other stakeholders. This accounts not only for the holding of the Cameroon National Education Forum in 1995 during which the teaching of Science, and Technology was highly recommended (Mbangwana, & Membeh, 2006) but also for the inter-ministerial concerted action of the year 2006 during which the four Ministries directly concerned with education in Cameroon, being: the Ministries of Basic, Secondary, and Higher Education, and the Ministry of Employment, and Vocational Training mobilized educational experts from within, and beyond the national frontiers to reflect on a sector-wide approach for education in Cameroon. Here, it was indicated that the Cameroon government, committed to promoting the development of information, and communication technologies in the educational system is reaffirming its options relating to their use as a factor for the amelioration of the quality of education, and learning in schools (Ndenge, 2013).

Among the strategies that were to be put in place to have this done, efforts were to be made to support the training of specialists in all the sectors of ICTs; permanently reinforce the capacity of the teaching personnel in the domain of educational technologies; pursue the development of communication infrastructure (intranet) in university campuses; support the use of ICTs by way of policy mutualisation through the creation of ICTs Excellence Centers; put in place the universities' interconnection network; support the use of ICTs in higher institutions of learning by the contribution of the entire nation; reinforce the capacity of universities in the line of ICTs development management amongst other things (Idem).

There have also been several reforms set to run from 2010-2035 aimed at enhancing quality higher education; with 2035 being the year in which Cameroon is expected to become an emerging economy. Instructive here is strategy N^{o} 6 of the National ICT policy, specifically objective N^{o} 3 that talks about the use of ICTs to improve quality, and access to education, training, research, and development (Apongnde, 2019a). Action N^{o} 3 of the said objective is emphatic on the need to develop distance training, particularly in higher education, and vocational training. Looking at these envisaged initiatives and strategies after more than a decade, the question that one is poised to pose is to understand whether they are really being applied in the higher education arena today. This interrogation seems pertinent because when we look at the level of techno-pedagogy in the context of higher education today in comparison with the UNESCO standards of 2008, and 2011 relating thereto, there is no gainsay in affirming that a lot still needs to be done.

III. LITERATURE REVIEW

Numerous studies and surveys have examined the utilization of modern technologies in higher education, but very little research has been carried out on quality higher education as an outcome of instructors' techno-pedagogical predisposition in Africa at large, and Cameroon in particular. However, several write-ups are reviewed here, with specific emphasis laid on literature from the year 2010 to date; the reason being that this period constitutes an era during which global discourse shifted from integration to the effective use of modern technologies in education. To that effect, Djeumeni Tchamambé (2010) treats the dichotomy that exists between

public policies, and the dispositions that are put in place to enhance the use of ICTs in the teaching process on the one hand or what she calls *techno-pedagogy*, and the skills, and practices that both teachers, and learners have relating thereto on the other hand. She concludes that there are limited skills on the side of the teachers, and there is an insufficient techno-pedagogical disposition caused by varied and incoherent policies.

Yu, and al. (2010) report that online discussions between students through social learning communities are networked through an artifact, such as mobile learning communities improve students' social connections; improves their self-esteem, and boosts their learning performance. Similarly, Karsenti, and al. (2012) indicate that ICTs can help ameliorate the quality of education in the African context by stating that teachers use ICTs to plan their lessons, (conduct documentary research through the internet, prepare documents), to deliver courses (video projectors, CD ROMs, educational software), and to carry out evaluations. They however remark that the ICT situation in African is very challenging, and open perspectives relating thereto; that is, in terms of outcomes, and capacity to replace traditional instruction methods.

Ndenge (2013) makes a synthesis of teachers' perception of ICTs in education, and development. He gives an implication on governments' *technocentric* view of ICTs for education, and development through the National ICT Policy document, and how this intend translates through implementation, utilization, and teacher development at the micro-level. He interrogates how hegemony influences public policy of ICTs which intend leads to poor implementation because contextual factors are not carefully considered before a policy is drafted. Ndenge observes a latent integration process of ICTs in education, and development, and urges that policy implications should include the need to greatly provide opportunities for training to teachers in the use of ICTs for education to encourage initiative for use. Apongnde (2019b) on his part examines Cameroon's graduate employability and affirms that techno-pedagogy has a significant role to play as an attenuating mechanism. To him, techno-pedagogy induces creativity, and self-reliance, multi-skilling, and tasking, professional excellence, and productivity, and finally, job flexibility, and mobility among graduates. He however notes that the adoption of this pedagogical innovation is marred by shortcomings at the levels of logistics, infrastructure, policies, users' skills, and motivation in Cameroon State universities.

To Onyema and Deborah (2019), the increasing use of technology in education has modified teachers' methods from the traditional approach that often place them as dispensers of knowledge to a more flexible approach where they act more as facilitators, mentors and motivators to inspire students to participate and learn. They further state that technology facilitates Remote learning, Distance learning, Virtual learning, Blended learning, Mobile learning, Distributed learning, Machine learning, Ubiquitous learning, Deep learning, Cooperative and Collaborative learning. They put forward that most aspects of education are going digital, and education stakeholders including students are confronted with the challenge of transition to online education. To them, the use of appropriate educational technologies increases accessibility to learning resources such as Massive Open Online Courses (MOOCs), and multiple learning approaches to meet the need of diverse learners.

The literature reviewed here is the outcome of reflections that are being developed around the World to bring education in general, and higher education in particular to acceptable quality standards that will allow learners to take advantage of emerging technologies in education, knowledge production, and the opportunities that await those who will become part of the global economy as graduates. While each country is developing its quality assurance system to meet its particular history, needs, and experiences, the process itself is not new, and the entire educational community is unanimous on the fact that modern technologies stand a better chance to turn the tights as far as quality higher education enhancement is concerned. This can be effective in the Cameroonian context if, and only if the teaching staff is adequately prepared to lead the success caravan.

IV. METHODS AND TOOLS

This study is a correlational survey; involving the quantitative approach. The study population is uniquely comprised of higher education instructors; randomly sampled, based on Krejcie, and Morgan's (1970) model. A total of 213 university instructors were selected from the public as well as private higher institutions of learning. While some of them were directly contacted on their various campuses, others were indirectly contacted via *Whatsapp*. The higher education sector was chosen purposively; given that it is where the issue of quality is highly felt in Cameroon nowadays. This is because it is the sector that produces graduates that directly integrate the society and/or the job market.

Questionnaires addressed to the university teaching staff were used to collect data. The questionnaires were comprised of twenty-nine (29) items, designed following Liquet's five-unit scale (Strongly Agree, Agree, Uncertain, Disagree, and Strongly Disagree). This technique helped us to determine instructors' level of agreement, disagreement, and uncertainty on the different items related to the degree of their techno-pedagogical predisposition, and the issue of quality higher education in Cameroon. The inferential statistical approach was used in data analysis, and Spearman's Correlation Index was used to test research hypotheses. Research hypotheses centre on instructors' access to technological devices, their training on technological innovations and initiative to use such technology in the teaching-learning process.

Analyses were done thanks to the Statistical Package for Social Sciences (SPSS). Inferential statistics thus helped us to determine the nature of correlation, and magnitude of instructors' techno-pedagogical predisposition's influence on the quality of higher education in Cameroon. Discussion of results was biffed up by Rogers' 2003 *Theory of Diffusion of Innovations*. It is a theory that seeks to explain how, why, and at what rate new ideas, and technology spread through cultures. This theory is relevant for this study because the issue under studies has to do with a people (instructors) adopting a technological innovation in an activity which is teaching.

V. RESULTS

Analyses are made here in two ways: descriptively, and inferentially.

Descriptive statistics

Descriptive analyses are concerned with instructors' demographic information, ranks, and institutions of origin. See tables below:

Table 1: Instructors' demographic information.

		Frequency	Percentage
Gender	Male	135	63.4%
	Female	78	36.6%
	Total	**213**	**100.0%**

Source: Field data (2021)

The table above shows that more male instructors (63.4%) against 36.6% female instructors were consulted. Information from the said table shows that male instructors were more accessible than their female counterparts. This directly paints a picture of a gender related digital divide situation that prevails in the field, given that more men are involved in the use of technologies in pedagogy than women. Instructors contacted were made up of part-time instructors, assistant lecturers, senior lecturers, associate professors and full professors as seen on the table below.

Table 2: Instructors' academic grades.

		Frequency	Percentage
Grade	Part-time instructors	60	28.2%
	Assistant Lecturers	54	25.4%
	Senior Lecturers	56	26.3%
	Associate Professors	22	10.3%
	Full Professors	21	9.9%
	Total	**213**	**100.0%**

Source: Field data (2021)

The table above shows that instructors of all grades were consulted, even though there were some variations in the number. Part-time, assistant, and senior lecturers appear as the most consulted; reason being that they were the most accessible.

Table 3: Informants' institutions of origin.

		Frequency	Percentage
University/ Institution	University of Yaounde I	113	53.1%
	University of Douala	22	10.3%
	University of Buea	27	12.7%
	Catholic University of Central Africa	18	8.5%
	Siantou University Institute	33	15.5%
	Total	**213**	**100.0%**

Source: Field data (2021)

Here above are the five universities/higher institutions randomly sampled for the study. The University of Yaounde I has the highest number of instructors consulted; given that its population is high and it is a university that is relatively advanced in matters of techno-pedagogy in Cameroon (Apongnde, 2019a).

Inferential statistics

Analyses here involve the degree of correlation that exists between the different variables. It should however be noted that inferential statistics presented in this article are obtained from descriptive statistics made on the different items of the questionnaire. They are presented in relation to the specific variables of the study; being: instructors' access to techno-pedagogical devices, instructors' training on techno-pedagogy, and instructors' initiative to use technology in pedagogy. It should however be noted that in the assessment of quality orchestrated by the integration of technologies in education, international scientific standards such as the ICT Competency Standards for Teachers, drafted by UNESCO in the year 2008, and 2011 are the leitmotiv. Regardless of the degree to which educational establishments are autonomous, in every country, they are considered to be fully accountable to society, being the *financier*, and the consumer. Maintaining such educational standards therefore requires that the most current techno-pedagogical innovations be adopted.

Instructors' access to techno-pedagogy devices as a catalyst of quality higher education in Cameroon

Access to technology has to do with making a careful consideration of affordances, and constraints of the technological tool when the tool is being incorporated in lessen. In this context, access to techno-pedagogical devices is measured in terms of the number, and types of technologies in use; the nature of software installed; internet connectivity, coverage and speed; electricity supply, amongst other things. See correlation table below.

Table 4: Instructors' access to techno-pedagogical devices and quality higher education

			Instructors' access to techno-pedagogical devices	Quality Higher education
Spearman's rho	Instructors' access to techno-pedagogical devices	Correlation Coefficient	1.000	.104
		Sig. (2-tailed)	.	.131
		N	213	213
	Quality Higher education	Correlation Coefficient	.104	1.000
		Sig. (2-tailed)	.131	.
		N	213	213

Source: Field data (2021)

Results portrayed through inferential statistics above illustrate that the degree of significance is negligible; that is, a P-value of above 0.05 is obtained. This shows that the first hypothesis is declared null. This implies that access to techno-pedagogical devices does not has a significant influence on the quality of higher education in Cameroon.

Instructors' training on techno-pedagogy as a guarantee for quality higher education in Cameroon.

Skills in techno-pedagogy are either acquired through formal training, in-service/continuous training or via *learning by doing* (Apongnde, 2019a). While the first two are sanctioned by an end of course testimonial, the last is got through familiarization, practice, and experience (Idem). Such training on technologies in pedagogy has an impact on the quality of education in general and higher education in particular. Such is the case as illustrated on the table below.

Table 5: Instructors' training on techno-pedagogy and quality higher education.

			Instructors' training on techno-pedagogy	Quality higher education
Spearman's rho	Instructors' training on techno-pedagogy	Correlation Coefficient	1.000	.408**
		Sig. (2-tailed)	.	.000
		N	213	213
	Quality Higher education	Correlation Coefficient	.408**	1.000
		Sig. (2-tailed)	.000	.
		N	213	213
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Field data (2021)

The table above shows that a P-value of 0.01 is obtained. This is largely below 0.05; an indication that the second hypothesis is validated. This therefore means that training on techno-pedagogy significantly affects the quality of higher education in Cameroon.

Instructors' initiative to use technology in pedagogy as a medium for quality higher education in Cameroon.

Initiative here has to do with the interest or decision on whether to or not to do a particular thing. As far as technologies in pedagogy are concerned in Cameroon higher institutions, instructors do express varied degrees of interest relating thereto. This situation is recurrent and affects the quality of higher education in Cameroon at various levels. See illustrative table below.

Table 6: Instructors' initiative to use technology in pedagogy and quality higher education

			Instructors' initiative to use technology in pedagogy	Quality higher education
Spearman's rho	Instructors' initiative to use technology in pedagogy	Correlation Coefficient	1.000	.762**
		Sig. (2-tailed)	.	.000
		N	213	213
	Quality higher education	Correlation Coefficient	.762**	1.000
		Sig. (2-tailed)	.000	.
		N	213	213
**. Correlation is significant at the 0.01 level (2-tailed).				

Source: Field data (2021)

A P-value of 0.01 is obtained, which is less than 0.05; implying that instructors' initiative to use technologies in education significantly influences the quality of higher education in Cameroon. This situation indicates that the third hypothesis is confirmed.

VI. DISCUSSION OF FINDINGS

It is not astonishing for one to realize that access to technological devices such as computers, video projectors, interactive whiteboards, internet connection et cetera in most Cameroon universities is less to be desired. This has for some time now been gradually becoming a custom within the university community. According to RIA (2012) cited by Apongnde (2019a), 7.7% of individuals in schools/universities, and libraries use computers. The number of teachers that do technology-mediated instruction is thus very minimal. These figures directly depict the reality in the field nowadays. Even though access to techno-pedagogical devices has been judged to be a factor that does not significantly work against quality higher education in Cameroon, its role is not negligible.

To Barry in Karsenti, and al. (2012), the number of teachers trained on the use of ICTs across Africa hardly goes above 25%, and a good number of them are not yet equipped

with skills to use the said tools. Till date, most, if not all university instructors are not formally trained on pedagogy; not to talk of haven been drilled on the use of technological innovations in the teaching-learning process. Most of them are Doctorate Degree holders that were simply drawn into the teaching corp. In the recent past, there were no class works/seminars at the Doctorate cycle. It is today, specifically with the advent of the famous *Post-Graduate Schools*, harbored by some Cameroon State universities that provision has been made for a one-year class work for 1st year Doctoral students.

Even though the situation is not the same in all universities, what is clear is that this novelty has not solved the problem in any way. If one peruses the curriculum content material of the Doctorate cycle, if it really exists, he will get to realize that ICT in Education/Training is not part of it. The teaching of ICT as a course, and not even as a course content material or better still, as a modern pedagogical approach usually ends at the Master's level in most higher institutions in Cameroon. The question of why knowledge of this innovative pedagogical approach is not imparted at the Doctorate level is still begging for a suitable response. It is rather unfortunate that this is happening at a time when the Doctorate cycle is the one that produces most of our university instructors.

As far as instructors' initiative to use technologies in pedagogy in Cameroon higher institutions is concern, one can say without fear of contradiction that the exercise is still at its embryonic stage. Even though instructors are obliged to do online instruction during this COVID-19 pandemic period, the interest is yet to be adequately felt. In higher institutions, as it is the case with the University of Yaounde I, this exercise is technically managed by the institutions' Computer Centers. A peripheral innovation relating thereto is the télé-evaluation exercise that the said university has been experimenting for the past years. Even though it is still at its pilot phase, it is praised for its ability to solve the famous problem of rapid growth in enrolment rates (*massification*) which is a veritable problem in most Cameroon State universities nowadays.

If one goes by Rogers (2003)'s Theory of Diffusion of Innovations, he will get to realize that for an innovation to be adopted by a people, it must comprise a given number of characteristic elements. Some of which includes the advantage that it has over existing technologies, its simplicity, *triability*, compatibility with existing values, and the ability for its results to be observed by potential adopters. The question that looms therefore is whether such is the case with the adoption of modern technologies in pedagogy in Cameroon higher institutions. To an extent, yes. The veritable problem is at the level of users' preparedness (Karsenti, & al., 2012); given that most of them are not trained to adopt new technologies in the teaching process. Given this state of affairs and the fact that technologies in pedagogy are on perpetual mutation, the fear of the unknown is rife; hence, accounting for instructors' to take initiatives in that regard.

VII. CONCLUSION AND RECOMMENDATIONS

This section deals with the major outcomes and the way forward. It is treated under conclusion and recommendations.

Conclusion

The challenge for Africa in general and Cameroon in particular in adopting techno-pedagogy is to improve the quality of higher education. The record to date in this area is however not particularly good; hence, a substantial drop in the quality of higher education. Quality higher education is not only essential for meeting people's basic needs but also fundamental in fostering the conditions for global peace, and sustainable development. All instructors, therefore, need to teach in active, collaborative, and self-directed ways to impact, and contribute to the general wellbeing of communities. To achieve this, it is not enough to measure the quality and quantity of what instructors impart as knowledge; it is essential to target the knowledge dissemination mechanisms. Such has been the case in point.

Recommendations

Based on the findings and conclusions of the study, a number of recommendations are made so as to enhance quality higher education in Cameroon. They are as follows:

Firstly, modern technological tools such as laptop computers, video projectors, interactive whiteboards et cetera should be put at the disposal of instructors more than ever before and broad-band high speed internet connection made to cover all amphitheaters.

Secondly, all instructors (male or female and young or old) of all academic ranks should regularly undertake techno-pedagogical training programs/seminars and be frequently drilled on emerging university pedagogical approaches, electronic messaging, tele-working and videoconferencing through different virtual platforms.

Thirdly, instructors should be encouraged to take their destiny into their own hands by effectively preparing notes with technological devices, delivering course content materials with such devices and evaluating students and safeguarding results with the said gadgets. This can be done by way of allocating some allowances for those who take such initiatives. Such moves will motivate users to take initiative relating thereto and it will go a long way to resolve problems that usually arise when educational resources are classically managed.

Given that education is a holistic process, and its components are interdependent in a way that technology-mediated pedagogy or techno-pedagogy cannot be quality-assured in isolation, while recommending precise technology-

oriented means, it is also worthwhile acknowledging that there are factors like enrolment, classroom management, education management information systems, environment, crises, et cetera that also influence higher education outcomes in Cameroon.

CONFLICT OF INTEREST

The author hereby declares no conflicts of interest regarding the publication of this paper.

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