

Distance Education Management and its Contribution to Teaching Effectiveness and Academic Performance in Cameroonian State Universities

Ako Nso Egbe¹

¹University of Yaounde I, Cameroon. Faculty of Education

Publication Date: 2026/06/16

Abstract: This research seeks to investigate the contribution of distance education management to teaching effectiveness and academic performance in Cameroonian state universities, while inefficient managerial mechanisms have limited strategic planning and practices within programs. The study specifically investigated the influence of ICT infrastructure, teaching strategies, administrative support, and student support services on teaching effectiveness and academic performance. The study adopted a mixed research design on a sample size of 318 participants, including 24 lecturers and 294 students, determined using the Krejci and Morgan table 1970. The quantitative data from the questionnaires were analysed using descriptive statistics and simple linear regression. Semi-structured interviews were conducted with three administrators, three lecturers, and the qualitative data were analysed using thematic analysis. A purposive sampling technique was used to determine the sample population of administrators, while a simple random sampling for lecturers and students. The results reveal that ICT infrastructure has a significant positive relationship with teaching effectiveness and academic performance, with a $\beta = 0.773$, $p < 0.000$. Teaching strategies have a significant positive relationship with teaching effectiveness and academic performance, with a $\beta = 0.726$, $p < 0.000$. Administrative support has a significant positive relationship with teaching effectiveness and academic performance, with a $\beta = 0.763$, $p < 0.000$. Student support systems have a significant positive relationship with teaching effectiveness and academic performance, with a $\beta = 0.830$, $p < 0.000$. The qualitative findings also reveal that effective administrative support influences ICT infrastructure accessibility, support services, innovative teaching strategies, and enhances academic performance. Distance education management depends on the interaction of these factors as a whole.

Keywords: Distance Education Management, ICT Infrastructure, Teaching Strategies, Administrative Support, Student Support Service, Teaching Effectiveness and Academic Performance.

How to Cite: Ako Nso Egbe (2026) Distance Education Management and its Contribution to Teaching Effectiveness and Academic Performance in Cameroonian State Universities. *International Journal of Innovative Science and Research Technology*, 11(6), 316-326. <https://doi.org/10.38124/ijisrt/26jun008>

I. INTRODUCTION

Distance education management is a paradigm linked to network society. This requires institutions offering distance education programs to adopt policies, technologies, and centralised management within interdependent functions for effective teaching and better academic performance. Strengthening organisational relations between students, faculty, and the institution through decentralised management, but also integrated functions. (Passos & Nunes, 2016). This management enables educational institutions to automate administrative processes, reduce the volume of paperwork, enhance operational efficiency, and enhance student support through appropriate technological infrastructure and training of instructors (Atalay, 2024). As

the demand for education rises, public universities in Cameroon such as the University of Yaoundé I, University of Yaoundé II, the University of Douala, the University of Buea, the University of Maroua and the University of Dschang have developed distance education programmes to enhance accessibility, quality, and equity in higher education.

➤ Statement of the Problem

However, despite the technological expansion and adoption, teaching effectiveness in distance education does not depend only on ICT infrastructure but also on managerial structure that coordinates administrative support, infrastructure, learner support systems and instructional activities (Garrison, 2017). In developing countries, especially Cameroon, the transition to distance learning has

been more reactive rather than strategic, with the outbreak of the COVID-19 pandemic. Raising concerns about how effective managerial commitment will produce sustainable institutional outcomes. Despite these efforts, more challenges exist compared to face-to-face instruction. Most Cameroonian universities do not have adequate digital infrastructure for supporting distance education, as some lecturers struggle to use WhatsApp, email and adapt online instructional material. Also, the internet in rural areas is unreliable, and frequent power failures make learning difficult. These students face difficulties accessing the Learning Management System platform (LMS), negatively impacting classroom interaction, motivation and learning outcomes. Alemnge (2018). Supports that distance education learners receive is inadequate, limited internet connectivity, inadequate technical services and an inexperienced help desk, impact the teaching and learning process. In order to ensure effective distance learning delivery, management must ensure instructional courses respect standards for higher education, continuous professional development of faculty is followed up on, and assessment methods associated with distance education are respected. Most state university lecturers are trained for face-to-face instruction (Tambo,2012; Mbabngong & Yaro, 2023; Loveline & Yufela,2024; Ndongfack,2013). Furthermore, Institutional managers lack a structural framework and a guide to monitor sustainable distance education programs. while institution have embraced the concept of distance education, its full potential remains unexplored as a result of ineffective managerial mechanism which limit policy formulation, allocation of adequate funds, technological resources and strategic planning for distance education programs in universities.

➤ Objectives of Research

- To assess the effect of ICT infrastructure on teaching effectiveness and academic performance in distance education programs.
- To evaluate the impact of teaching strategies on teaching effectiveness and academic performance in distance education.
- To determine the role of administrative support on teaching effectiveness and academic performance in distance education.
- To assess the influence of student support systems on teaching effectiveness and academic performance in distance education

➤ Research Hypothesis

- Ha1:ICT infrastructure significantly influences teaching effectiveness and academic performance in distance education.
- Ha2: Teaching strategies have a significant influence on teaching effectiveness and academic performance in distance education.
- Ha3: Administrative support has a significant influence on teaching effectiveness and academic performance in distance education.

- Ha4: Student support systems have a significant influence on teaching effectiveness and academic performance in distance education.

II. LITERATURE REVIEW

➤ Infrastructure and Academic Performance:

According to Lamidi (2021), there has been much emphasis on technology as a driver of ODL. However, ICT support systems have been criticised and frequently considered inadequate in preparing students for success (Makoe & Nsamba, 2019; Sanchez-Elvira, Paniagua, & Simpson, 2018). Kear et al. (2016) opine that more than the mere presence of technology is needed, and institutions must assist students in their academic work; otherwise, the quality of technology will be compromised. Lamidi (2021) argued that the availability of quality ICT increases the rate of academic performance amongst learners. However, more than the availability of technology alone is needed to impact academic performance. The students must have the necessary skills to manipulate and utilise this technology while learning. This calls for the institution to provide training and support for both teachers and students.

ICT infrastructure improves students' academic performance, as students have the possibility to learn from a distance. Those who actively engage with ICT tools tend to achieve better academic results. Increased investment in ICT infrastructure, digital training programs for students and educators, improved internet accessibility, and the implementation of institutional policies that promote ICT integration in teaching and learning (Usman & Abdulrazaq,2025; Haji,2023; Tanyi,2022). ICT infrastructure facilitates online assessment assignments, and the presence of technology in education has reshaped how students interact with content, peers, and teachers (Ratheeswari,2025).

➤ Teaching Strategies (Methods) and Academic Performance:

According to Alzahrani (2019), Most Universities offering distance education courses focus on synchronous and asynchronous teaching methods to improve students' motivation and academic performance. However, synchronous teaching produces better results than an asynchronous delivery method. Moreover, both methods are beneficial as they limit physical distance, save time and money, improve professional training and overcome cultural challenges. Levin, He and Robbins (2006) contrasted the two teaching methods; synchronous learning helps students develop critical reflection levels more than asynchronous learning. In addition, Yang and Tang (2003) assert that using synchronous learning in class discussion resulted in better quality feedback and quantity of discussion compared to students who participated only in asynchronous learning. Furthermore, asynchronous distance learning lacks instant feedback (Schullo, Venable, Barron, Kromrey, Hilbelink, & Hohlfeld, 2005); learners are isolated by physical distance (Vonderwell, 2003). Collaborative learning promotes student engagement, especially in online courses that require critical thinking and problem-solving skills. Also, the integration of an active learning sequence facilitates group discussion. (Laal

and Ghodsi, 2012; Wagino et al,2024). Collaborative learning fosters students' interaction in an online learning environment through instructors' guidance (Ratheeswari,2025).

➤ *Teaching Strategies and Teaching Effectiveness in Distance Education*

Effective communication between tutors and learners improves interaction, engagement, student satisfaction and course completion rates (Garrison, 2017). Without regular communication, students may feel isolated, leading to decreased motivation and engagement (Boettcher & Conrad, 2021). Personalised feedback from instructors on assignments improves students' engagement (Nicol, 2020). Live chat discussion engages learners more (Garrison, 2017). Synchronous and asynchronous communication: Combining live video sessions with email and discussion board interactions ensures accessibility (Boettcher & Conrad, 2021). Weekly announcements: A structured weekly email or video update helps students stay informed and connected (Palloff & Pratt, 2018).

The digital tools used for online learning need to be harnessed to boost engagement and cater to varying styles of learning. According to Mayer (2020), multimedia such as text, visuals, audio, and other interactive elements aid students in retaining knowledge. Moreover, adaptive learning technologies can dynamically adjust instruction based on students' unique needs (Boettcher & Conrad, 2021), for example, interactive quizzes and adaptive assessments.

➤ *Student Support Services and Learning Outcomes*

Distance learning systems need to design student support services, which are the heart of distance learning systems, even though it is a complex management system. There are several factors to be taken into account while designing and managing student support services. The first service that a distance learning institution offers is to reach out to prospective learners with information about the programs, courses, and other details. Learner Support Service aims at forming learning communities and continuing community education (Kumtepe et al.,2018, p.115); this support service brings about student satisfaction associated with persistence, academic performance, retention, and career advancement (Fidzani et al,2023). Student support services include administrative, academic, psychosocial and technical support services. The proper function of the distance education system depends on a robust student support system. As students engage in self-study at their convenience, using study materials and other learning resources, it becomes clear that these resources are required to sustain a quality distance education programme. The parent organisation should have these resources in place to support students, faculty, and the programme or institution towards achieving the goal of adequate and appropriate learning. Responsive and flexible human resources, knowledge, skills, policies, procedures, and technical infrastructure enable quality practices and contribute to quality results (Gunasekera,2014). Learner support services require schools to put in place programs and curricular activities that guarantee long-term success in learning (Njui, 2018; Zawacki-Richter,2023).

➤ *Administrative Support and Teaching Effectiveness*

As an integral part of the administrative support service in ODL, university personnel contribute most to a student's social integration into a university setting. They are responsible for creating a campus atmosphere that gives students a sense of security and success. Kisimbii et al. (2018) explain that there are activities that university personnel provide to students to enable students to persist. These include orientation of new students, provision of the academic calendar, study timetable, teaching and learning unit-by-unit guide, and course modules at the beginning of the semester. These services facilitate students' preparedness for practical coursework in the semester. They also instil discipline and orderliness in the conduct of students toward successful learning and teaching. Institutions need to ensure that all information students may need is readily available on school websites and learning management systems. Kumtepe et al. (2018) hold that registration, scholarship status, academic calendar, examination organisation, and other administrative content should be available to students whenever needed. Moreover, institutions should ensure that the administrative staff have the technical and administrative capability to support ODL students and create memorable learning experiences. They further advise that institutions should place technical help desks and call centres that students can access and get help from as an administrative support measure. Administrative support services are services put in place to ensure the smooth running of Open and Distance learning systems. These include the admission, guiding students throughout their semester, and allocating instructors to support during the instruction process. Administrative support services ensure an adequate supply of information regarding choice and course registration requirements and play a coordinating role. It ensures the efficient delivery of all the functions within the distance learning adequately (Aminudin, Navaratnasamy, & Saman, 2019).

III. RESEARCH METHODOLOGY

This study adopted a mixed-method research design, combining qualitative and quantitative research methods, providing an in-depth understanding of the topic while focusing on the pragmatism paradigm. It allows for a detailed exploration of perceptions, experiences, and outcomes in distance education while also providing measurable data to support the study. The sample size was determined using the Krejcie & Morgan table (1970), which consisted of 318 participants, including students, lecturers, and administrators from six public universities offering full-time distance education programmes. Purposive sampling was used to select administrators. For lecturers and students, the study employed simple random sampling. A Likert questionnaire was used to collect data for students and lecturers and analysed using SPSS version 25, while semi-structured interviews were conducted with three administrators and three lecturers and data were thematically analysed. The hypotheses were tested using regression.

➤ *Presentation of Finding*

The results of the study are presented following the research questions and hypotheses. Data were collected using

questionnaires and interview analyses. The descriptive analysis was done on students and lecturers' data collected from the questionnaires.

• *Analysis of Students' Questionnaires*

✓ *Effect of ICT Infrastructure on Distance Education*

Table 1 Students' Views on ICT Infrastructure

		N =294	M	STD
No	Items			
1	I have reliable internet access for online learning		2.56	1.35
2	I own or have access to a suitable device for learning (laptop, tablet and smartphones).		3.87	1.17
3	E-learning platforms provided by the university are user-friendly (Moodle, Zoom, Google Classroom).		3.23	1.47
4	I receive technical support when ICT issues arise.		2.04	1.07
5	Online resources are available and accessible at any time.		3.09	1.61
6	I have received training on how to use digital tools for learning.		2.52	1.51
7	The ICT tools used help me better understand my course content.		3.38	1.44
Grand Total			2.95	0.17

From Table 1, six items out of seven on ICT infrastructures had a mean above our cutoff mean of 2.5, designed in the questionnaire to respond to respondents' views on ICT infrastructures. Which implying that students

agree that ICT infrastructure influences teaching effectiveness and academic performance in distance education. Also, our grand mean of 2.95 confirms the assertion.

✓ *Impact of Teaching Strategies on Distance Education Students' Views*

Table 2 Students' Views on Teaching Strategies

		N=294	M	STD
No	Items			
1	Lecturers use interactive teaching methods (live polling, discussions, quizzes, peer collaboration, lectures, flipped classroom model).		4.24	0.89
2	Multimedia resources (interactive videos, slides, virtual whiteboards) are used in lessons.		3.24	1.52
3	Online classes encourage my participation and interaction.		3.70	1.60
4	The lessons are structured and easy to follow.		3.18	1.46
5	I complete assessments (assignments, quizzes) related to the lessons regularly.		2.96	1.39
6	Online materials are relevant and updated.		4.18	1.07
7	The teaching style helps me understand and retain content.		4.14	1.34
8	I feel that I am achieving my learning goals in this program.		4.55	1.06
Grand Total			3.77	0.23

From Table 2, all eight items have a mean above the 2.5 cut-off, implying that students strongly agree that teaching strategies influence teaching effectiveness and academic

performance in distance education, as supported by our grand mean of 3.77.

✓ *Role of Administrative Support on Distance Education*

Table 3 Students' View on Administrative Support

		N=294	M	STD
No	Items			
1	I receive updates about course schedules and academic activities.		3.41	1.53
2	University administration responds to my inquiries about online learning.		2.58	1.46
3	There are clear procedures for online learning and assessments.		3.21	1.55
4	Administrative support helps me overcome academic or technical challenges.		3.08	1.49
5	Distance learning activities are well-organised by the university.		3.37	1.49
6	I know who to contact when I have administrative issues.		1.99	1.23
7	The university invests in improving the distance education system.		4.18	1.07
8	Policies and rules related to online learning are clearly communicated.		3.04	1.60
Grand Total			3.10	0.16

From Table 3, all eight items have a mean above the 2.5 cut-off, implying that students strongly agree that administrative support influences teaching effectiveness and

academic performance in distance education. The overall mean of 3.10 confirms the assertion.

✓ *Effect of Student Support Systems on Distance Education*

Table 4 Students' Views on Support Systems

No	Items	N=294	M	STD
1	I receive academic guidance and counselling when needed.		2.61	1.61
2	Technical assistance is easily available to help me access learning resources.		2.19	1.44
3	I can interact with my classmates and lecturers outside of class via forums or chats.		3.29	1.53
4	Online library resources are available and helpful.		2.67	1.54
5	I know how to access support services provided by the university.		3.27	1.49
6	The support I receive helps me stay on track academically.		3.04	1.60
7	I participate actively in my online courses.		3.20	1.55
Grand Total			2.89	0.05

From Table 4, seven out of eight items have a mean above the 2.5 cut-off, implying that students agree that student support influences teaching and learning in distance

education and also supported by the overall mean of 2.89 to confirm this statement.

✓ *Academic Performance*

Table 5 Students' Views on Academic Performance

No	Items	N=294	M	STD
1	I can follow and understand lessons delivered online.		3.50	1.48
2	I complete online assignments and activities on time.		3.21	1.55
3	I feel more responsible for my learning in a distance environment.		3.29	1.53
4	I collaborate effectively with classmates in online activities		2.68	1.54
5	Distance learning has improved my academic performance(GPA).		3.27	1.49
6	I can access and use learning materials easily.		3.04	1.60
7	I feel academically competent in my field of study.		3.21	1.55
Grand Total			3.17	0.037

From Table 5, the seven items had a mean above our cutoff mean of 2.5, and our overall mean conformed to the cutoff of 3.17.

• *Analysis of Lecturers' Questionnaires*

✓ *Effects of ICT Infrastructure on Distance Education Lecturers' Views*

Table 6 Lecturers' Views on ICT Infrastructure

No	Items	N=24	M	STD
1	I have the necessary equipment (e.g., laptop, camera, internet, interactive whiteboard) to conduct online lessons.		4.70	0.46
2	My university provides adequate digital tools and platforms for distance teaching.		3.29	1.54
3	The learning management system is functional and user-friendly.		4.41	0.50
4	I receive technical support when ICT problems occur.		3.70	1.30
5	My ability to use ICT tools enhances my teaching quality.		4.87	0.33
6	I have received adequate training on e-teaching platforms.		4.83	0.38
7	The ICT infrastructure supports effective student learning.		3.83	1.55
Grand Total			3.23	0.52

From Table 6, all seven items had a mean above our cutoff mean of 2.5, added to our grand mean of 3.23, which

confirms that lecturers strongly agree that ICT infrastructure influences teaching effectiveness and academic performance.

✓ *Impact of Teaching Strategies on the Distance Education Lecturers' View*

Table 7 Lecturers' Views on Teaching Strategies

No	Items	N=24	M	STD
1	I apply a range of digital teaching strategies in my classes, i.e Collaborative learning and Peer learning		4.58	0.50
2	My lessons are designed to promote student interaction.		4.19	0.28
3	I use visual and multimedia tools to enhance student engagement.		4.62	0.49
4	I monitor student participation and engagement in online activities.		4.66	0.48
5	My students submit assignments and assessments on time.		2.79	1.55
6	My teaching promotes knowledge retention and critical thinking.		4.62	0.49
7	I track learning outcomes based on class performance and feedback.		4.70	0.46
8	I adapt my instructional methods based on student needs.		4.58	0.50
			4.34	0.36

From Table 7, all eight items' means are above our cutoff mean of 2.5, and our overall grand mean of 4.34, which

confirms that lecturers strongly agree that teaching strategies influence teaching effectiveness and academic performance.

✓ *Role of Administrative Support on Distance Education Lecturers' Views*

Table 8 Lecturers' Views on Administrative Support

No	Items	N=24	M	STD
1	University administration supports the planning and implementation of online programs.		4.83	0.38
2	I receive updates and guidance from the institution regarding distance education.		4.87	0.33
3	Administrative bottlenecks delay the effectiveness of distance teaching.		4.25	1.22
4	Distance learning policies are clear and well-disseminated.		3.50	1.61
5	Administrative staff respond to my academic or logistic concerns.		3.08	1.61
6	Online academic calendars and schedules are well-managed.		3.04	1.65
7	Management ensures smooth coordination of online course delivery.		3.75	1.42
8	I am consulted on matters related to online teaching improvements.		2.25	1.42
9	Adequate Budget and material resources are allocated for distance education programs.		2.37	1.52
			3.58	048

From Table 8, all nine items have a mean above the cutoff mean of 2.5. Also, the grand mean of 3.58 confirms that lecturers strongly agree that administrative support

significantly influences teaching effectiveness and academic performance.

✓ *Effect of Student Support Systems on Distance Education Lecturers' Views*

Table 9 Lecturers' Views on Student Support Services

No	Items	N=24	M	STD
1	Students have access to academic and psychological support.		2.62	1.61
2	There are mechanisms for tracking student progress and engagement.		4.54	0.50
3	Student issues (technical or academic) are addressed promptly.		2.75	1.59
4	I can refer students to academic or counselling services when needed.		4.33	0.48
5	I receive support to follow up on struggling or inactive students.		3.08	1.61
6	There are mechanisms to support students' participation in online learning.		3.16	1.60
7	Students engage actively with the content I provide.		3.29	1.62
8	Peer interactions among students improve learning outcomes.		4.58	0.50
9	Student support services are accessible, effective and contribute to better academic performance.		2.66	1.40
			3.44	0.51

From Table 9, the nine items in the questionnaire on lecturers on students' support services had a mean above the cutoff mean of 2.5. Respondents strongly agree that students'

support services influence teaching effectiveness and academic performance, with an overall mean of 3.44 to confirm.

✓ *Teaching Effectiveness*

Table 10 Lecturers' View on Teaching Effectiveness

No	Items	M	STD
1	The course content is presented on the online platform.	4.87	0.33
2	The teaching methods used online promote understanding of the subject.	4.91	0.28
3	Lecturers use a variety of instructional materials (videos, slides, flipped classroom, etc.).	4.83	0.38
4	Online lessons are interactive and encourage participation.	4.87	0.33
5	Lecturers provide prompt and useful feedback on assignments.	4.70	0.46
6	There is remarkable progress in students' performance in exams.	4.33	1.34
		4.75	0.37

From Table 10, all six items have a mean above our cutoff mean of 2.5. The overall mean of 4.75 confirms that teaching effectiveness influences academic performance.

IV. QUALITATIVE ANALYSIS

From the qualitative analysis involving three administrators and three lecturers, the following conclusions were drawn from the thematic analysis. The key ICT challenges in distance education are unstable Internet connections, power failure or lack of backup power sources, lack of technical support, digital literacy issues and technology access disparities. These obstacles together prevent effective teaching and negatively affect academic performance in distance education contexts. The results also hold that not only technology solutions are needed to solve ICT problems, but also administrative leadership, flexible teaching strategies to improve students' engagement online, sustainable funding, and capacity building to be put in place at the Cameroonian state university. This reinforces the necessity for policies to address accessibility, the development of digital skills, and adapting interactive modes of teaching to improve distance education management in Cameroon Public universities.

➤ *Correlations of Variables*

The Pearson correlation shows the relationship between the independent variables (ICT infrastructure, teaching strategies, Administrative support and student support) on the dependent variables, teaching effectiveness and academic performance. A correlation analysis was done. Showing the outcome of ICT infrastructure, Teaching strategies, Administrative support, and student support on Teaching effectiveness and academic performance. Concerning the strength of relation between the ICT infrastructure and teaching strategies (Pearson's $r(317) = 0.007, p < .01$), ICT infrastructure and administrative support (Pearson's $r(317) = 0.861, p < .01$), ICT infrastructure and student support systems (Pearson's $r(317) = 0.836, p < .01$), ICT infrastructure and Teaching effectiveness and academic performance (Pearson's $r(317) = 0.773, p < .01$), Teaching strategies and administrative support (Pearson's $r(317) = 0.740, p < .01$), Teaching strategies and student support systems (Pearson's $r(317) = 0.702, p < .01$), Teaching strategies and Teaching effectiveness and academic performance (Pearson's $r(317) = 0.726, p < .01$), Administrative support and student support systems

(Pearson's $r(317) = 0.875, p < .01$), Administrative support and Teaching effectiveness and academic performance (Pearson's $r(317) = 0.763, p < .01$) and Student support systems and Teaching effectiveness and academic performance (Pearson's $r(317) = 0.830, p < .01$).

➤ *Test of Hypotheses*

- *Ha1: ICT Infrastructure Significantly Influences Teaching Effectiveness and Academic Performance in Distance Education*

Regression was carried out to ascertain the extent to which ICT infrastructure influences teaching effectiveness and academic performance in distance education. The regression model predicted a 59.8% change in Teaching effectiveness and academic performance, which is accounted for by ICT infrastructure. The scatterplot showed a strong positive linear relationship between ICT infrastructure on teaching effectiveness and academic performance, which was confirmed with a Pearson's correlation coefficient of $r = 0.773$. The model was a good fit for the data.

ANOVA results show that the linear regression there is a significant influence of ICT infrastructure on teaching and learning, with $p = 0.000$ in our model. The model was a good fit for the data ($F(1, 316) = 470.353, p < 0.000$). The regression equation showed a significant relationship between ICT infrastructure as a predictor of teaching effectiveness and academic performance ($t=21.688, p < 0.000$). The slope coefficient for ICT infrastructure is 0.773, so teaching effectiveness and academic performance increase by a factor of 0.773.

- *Ha2: Teaching Strategies have a Significant Influence on Teaching Effectiveness and Academic Performance in Distance Education.*

Regression was carried out to appraise the extent to which teaching strategies influence teaching effectiveness and academic performance in distance education. The regression model predicted a 52.8% change in teaching effectiveness, and academic performance is accounted for by teaching strategies. The scatterplot showed a strong positive linear relationship between teaching strategies and teaching effectiveness and academic performance, which was confirmed with a Pearson's correlation coefficient of $r = 0.726$. The model was a good fit for the data.

ANOVA results show that in the linear regression, there is a significant influence of teaching strategies on teaching effectiveness and academic performance, with $p = 0.000$ in our model. The model was a good fit for the data ($F(1, 316) = 353.096, p < 0.000$). The regression equation showed a significant relationship between teaching strategies and teaching effectiveness and academic performance ($t=18.791, p < 0.000$). The slope coefficient for teaching strategies is 0.726, so teaching and learning increase by a factor of 0.726.

- *Ha3: Administrative Support Has a Significant Influence on Teaching Effectiveness and Academic Performance in Distance Education.*

Regression was carried out to appraise the extent to which administrative support influences teaching effectiveness and academic performance in distance education. The regression model predicted 58.2 % change in Teaching effectiveness and academic performance, which is accounted for by administrative support. The scatterplot showed a strong positive linear relationship between administrative support and teaching effectiveness and academic performance, which was confirmed with a Pearson's correlation coefficient of $r = 0.763$.

ANOVA results show that in the linear regression, there is a significant influence of administrative support on teaching effectiveness and academic performance, with $p = 0.000$ in our model. The model was a good fit for the data ($F(1, 316) = 439.693, p < 0.000$). The regression equation showed a significant relationship between administrative support as a predictor of teaching effectiveness and academic performance ($t=20.969, p < 0.000$). The slope coefficient for administrative support is 0.763, so teaching effectiveness and academic performance increase by a factor of 0.763.

- *Ha4: Student Support Systems Have a Significant Influence on Teaching Effectiveness and Academic Performance in Distance Education.*

Regression was carried out to appraise the extent to which student support affects teaching effectiveness and academic performance in distance education. The regression model predicted a 68.9% change in teaching effectiveness, and academic performance is accounted for by student support systems. The scatterplot showed a strong positive linear relationship between student support systems and teaching effectiveness and academic performance, which was confirmed with a Pearson's correlation coefficient of $r = 0.830$. The model was a good fit for the data ($F(1, 316) = 700.157, p < .000$).

ANOVA results show that in the linear regression, there is a significant influence of student support systems on teaching effectiveness and academic performance, with $p = 0.000$ in our model. The model was a good fit for the data ($F(1, 316) = 700.157, p < .000$). The regression equation showed a significant relationship between student support systems as a predictor of teaching effectiveness and academic performance ($t=26.460, p < 0.000$). The slope coefficient for student support is 0.830, so teaching effectiveness and academic performance increase by a factor of 0.830.

V. DISCUSSIONS

The findings reveal that ICT infrastructure has a positive effect on teaching effectiveness and academic performance. With an overall mean of 3.05 on the construct, respondents agreed. The regression coefficient was positive ($\beta=0.773$), indicating that ICT infrastructure improves teaching effectiveness and academic performance. The p-value (0.001) was lower than the 0.05 significance level, confirming that the relationship was statistically significant. Furthermore, the R^2 value of 0.598 showed that 59.8% of the variation in teaching effectiveness and academic performance was explained by ICT infrastructure. Idowu (2025) also confirms this assertion that ICT improves students' academic performance and increases teaching efficiency. Using adequate ICT tools will improve students' engagement in the classroom and reduce dropout rate in Higher Education distance education programs. For instructors, its flexibility makes it more comfortable and adaptive for teaching at a distance. Technology-based learning is more effective as they aid in an active learning environment for both teachers and students (Ghavifekr & Rosdy, 2015; Bairu, 2020; Nyongesa & Otieno, 2020). Tools such as virtual collaborative platforms, Massive Open Online Courses (MOOCs), Learning Management systems, holographic teachers and computerised teaching assistants help students to have real-time interaction during learning and have access to resources from anywhere (Rozo-García & Ramírez-Montoya, 2025, Tanyi, 2022, Haji, 2023, Egbe, 2022, Foukoura, 2006).

The findings also reveal that teaching strategies positively influence teaching effectiveness and academic performance in distance education. With an overall mean of 3.82 on the construct, respondents strongly agreed. The regression coefficient was positive ($\beta=0.726$), indicating that teaching strategies improve teaching effectiveness and academic performance. The p-value (0.001) was lower than the 0.05 significance level, confirming that the relationship was statistically significant. Furthermore, the R^2 value of 0.528 showed that 52.8% of the variation in teaching effectiveness and academic performance was explained by teaching strategies. Xu, Yang, Zhang and Liu (2025) support our results that online teaching strategies such as communication, collaboration, and problem-solving will permit instructors to create authentic scenarios and use assessment methods that will engage learners and improve their learning outcomes. Shi, Hur, Tang and Vanessa (2023) point out that online teaching strategies such as collaborative learning and peer-to-peer feedback improve learners' engagement and assessment outcomes. Synchronous and asynchronous methods can improve teaching in distance education and improve classroom participation (Billoso et al 2023; Tabe, 2025).

The results show that administrative support has a positive impact on teaching effectiveness and academic performance in Distance Education, with an overall mean of 3.14 respondents agreed. The regression coefficient was positive ($\beta=0.763$), indicating that administrative support improves teaching effectiveness and academic performance. The p-value (0.001) was lower than the 0.05 significance

level, confirming that the relationship was statistically significant. Furthermore, the R^2 value of 0.582 showed that 58.2% of the variation in teaching effectiveness and academic performance was explained by administrative support. Meyer (2009) and Ndege, et al (2023). supports our results that administrative support through online program policies, staff development programs, faculty incentives, faculty development programs and faculty mentoring programs improves performance in distance education management. He also adds that administrators adequately understand the needs of online teaching faculty; they are better prepared to make good decisions concerning the development of processes to provide better support through reliable and responsive IT support, which is essential for online content delivery and efficiency at the faculty level. Zawacki-Richter (2023) also confirms that administrative support covers a wide range of activities such as program policies and regulations, student recruitment, admission and enrolment, academic counselling, financial aid, billing and payment, it infrastructure policies and procedures, human resources training and professional development, course materials and learning resources creation and sharing, libraries, archives, and repositories, student assessment and certification and quality assurance which affect the quality of learning experience.

The results show that student support has a positive impact on teaching effectiveness and academic performance in distance education, with an overall mean of 2.93 respondents agreed. The regression coefficient was positive ($\beta=0.830$), indicating that student support improves teaching effectiveness and academic performance. The p-value (0.001) was lower than the 0.05 significance level, confirming that the relationship was statistically significant. Furthermore, the R^2 value of 0.689 showed that 68.9% of the variation in teaching effectiveness and academic performance was explained by student support. Talt and Alan (2003) affirm our finding that adequate student support will reduce dropout rate and improve student engagement in open and distance learning programs. He also adds that psycho-social support through a counselling unit in distance education may keep students more focused. Dzakiria (2005) points out that learner support in distance learning improves learning outcomes, as students receive real-time online feedback from administrative units when necessary. Student support can be seen in three dimensions: cognitive support, management support and emotional support in distance learning, which improves learners' satisfaction through classroom interaction and engagement during lessons (Sewart,1998). Cognitive support, emotional support, and management support influence distance learners' satisfaction as it improves personnel learning needs, improve service quality, and promote online learning (Zhao, Shao, & Su,2022). Student support is a key indicator for effective distance education management. This support can be synchronous and asynchronous in nature, maintaining the quality of education at a global level (Rumble, 2000). Most universities invest a lot in technical support, while will students support services are lagging in distance education (Usun,2004). Student support services are one of the pillars of distance education. This service enhances students' learning and acquisition of knowledge, as its enhance students' motivation through

service feedback (Shabani, Omari & Kefiloe, 2021; Orr et al., 2009).

VI. CONCLUSION

Distance education management contributes to teaching and learning effectiveness in Cameroonian state universities. Efficient strategic management positively influences institutional performance. The results show a link between administrative support, ICT infrastructure, students' support systems, teaching strategies and teaching and learning performance. Administrative support is a key factor in developing distance education as it controls other factors. Effective communication will reduce bureaucratic delays and improve administrative management.

➤ *Compliance with Ethical Standards*

The researcher respected all the ethical principles in accordance with the research protocols. The researcher obtained a research authorisation letter from the Faculty of Education of the University of Yaounde I, Cameroon, to carry out the study. In the course of the research, the researcher avoided publishing the confidential information of participants without permission. In the course of the research, the researcher avoided publishing the confidential information of participants without permission. This included obtaining permission from the various universities offering distance education programs to conduct the study; confidentiality inform consent were also respected. All the instruments used didn't include participants' names to keep them anonymous while assuring them that the information would be used strictly for academic purposes. Participants voluntarily participated in the study as they had an insight into the consent letter that was presented to them before carrying out the research.

➤ *Conflict of Interest*

The authors declare no conflicts of interest.

REFERENCES

- [1]. Alemnge, F.L. (2018). Distance learning models and their effectiveness in Cameroon Higher Education. *Creative Education* 9, 791-817. <https://doi.org/10.4236/ce.2018.95059>.
- [2]. Alzahrani, A.A (2019).The Effect of Distance Learning Delivery Methods on Student Performance and Perception.*International Journal for Research in Education*,43(1),292-317
- [3]. Aminudin, Z., Navaratnasamy, K., & Saman, T. (2019, August 2). Supporting Students to succeed in Open and Distance Learning in the Open University of Sri Lanka and Universitas Indonesia. *Emerald Insight*, 7-10. Retrieved from www.emeralinsight.com/2414.6994.htm.
- [4]. Atalay.A ,(2024).Leading from afar: navigating the challenges and strategies of distance management in education. *Turkish Online Journal of Distance Education-TOJDE*,26(3)25-39.
- [5]. Billoso, V., Cortes, M., Fabila, N., Perez, J. & Sarmiento, N. (2023). Strategies for online teaching: A

- best practice approach using three-domain theories. *International Journal of Educational Management and Development Studies*, 4 (1), 129-145. <https://doi.org/10.53378/352972>
- [6]. Boettcher, J. V., & Conrad, R. M. (2021). *The online teaching survival guide (2nd ed.)*. Jossey-Bass.
- [7]. Dzakiria, H. (2005). The Role of Learning Support in Open & Distance Learning: Learners' experiences and perspectives. *Turkish Online Journal of Distance Education-TOJDE* 6(2) 95-109
- [8]. Egbe, A. (2022). *The contribution of the Education Management Information System on administrative effectiveness of secondary schools in Yaoundé municipality, Cameroon. Master's thesis. ResearchGate.* <https://doi.org/10.13140/RG.2.2.28438.56640>.
- [9]. Fidzani A M and Joseph A K (2023). Assessing Student Support Services in Open and Distance Learning: The Case of Botswana Open University. *Teachers learning through flexible learning in the African Journal*. 4, 2788-6298. <https://doi.org/10.35293/tetfle.v4i1.4217>
- [10]. Garrison, D. R. (2017). *E-learning in the 21st century: A community of inquiry framework for research and practice (3rd ed.)*. Routledge.
- [11]. Ghavifekr, S. & Rosdy, W.A.W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science (IJRES)*, 1(2), 175-191.
- [12]. Gunasekera, D. (2014). A policy framework for distance education support services: A model. *International Knowledge Sharing Platform* 4(13) 51-58.
- [13]. Haji.S.A (2023). Examining the role of engagement in blended learning and its effects on learning outcomes and satisfaction in Cameroon's higher education. *European Journal of Open Education and E-learning Studies* 11(1). <http://dx.doi.org/10.46827/ejoe.v8i3.5223>
- [14]. Idowu, E. (2025). The Impact of ICT on Teaching and Learning in Higher Education Institutions. *Preprints.org*, 1-12. <http://doi:10.20944/preprints202504.1600.v1>
- [15]. Kisimbii, J., Gakuu, C. & Kidombo, H. (2018). Administrative Support Services and Retention of Distance Students: The Case of Bachelor of Education Programmes of the University of Nairobi, Kenya. *International Journal of Science and Research (IJSR)*, 9(2), pp. 96-106
- [16]. Kumtepe, G. E., Toprak, E., Ozturk, Buyukkose. T.G, and Kilinc, H. (2018). Support Services in Open and Distance Education: An Integrated Model of Open Universities. *ResearchGate*, <https://www.researchgate.net/publication/337532956>
- [17]. Laal, M., and Ghodsi, S. M. (2012). Benefits of collaborative learning. *Procedia Soc. Behav. Sci.* 31, 486-490. <https://doi.org/10.1016/j.sbspro.2011.12.091>.
- [18]. Levin, B., He, Y., & Robbins, H. (2006). Comparative analysis of preservice teachers' reflective thinking in synchronous versus asynchronous online case discussions. *Journal of Technology and Teacher Education*, 14(3), 439-460
- [19]. Loveline, Y. , & Yufela, N. C. (2024). E-Learning and Students' Academic Performance in Cameroon's State Universities. *American Journal of Online and Distance Learning*, 3(1), 37-57. <https://doi.org/10.47672/ajodl.1882>.
- [20]. Lumadi, R. (2021). Enhancing student development through support services in an open distance learning institution: A case study in South Africa. *South African Journal of Higher Education*, 35(1), 113-126. <https://doi.org/10.20853/35-1-4422>
- [21]. Mayer, R. E. (2020). *Multimedia learning (3rd ed.)*. Cambridge University Press.
- [22]. Mbabngong, F. , & Yaro, L. (2023). Course content organisation in distance learning programs in Cameroon higher education institutions. *GPH-International Journal of Educational Research*, 6(07), 77-91. <https://doi.org/10.5281/zenodo.8265357>
- [23]. Ndege, W.M, Ndiritu. A & Gatotoh, A.M (2023). Learner academic support services and retention of students in open distance learning programmes: the case of selected universities in Kenya. *African Journal of Emerging Issues (AJOEI)*. 5(17)122-139.
- [24]. Ndongfack, M. N. (2016). Baseline study on the current state of open and distance learning in Cameroon. Yaounde: Commonwealth of Learning.
- [25]. Nicol, D. (2020). *The power of feedback: Giving, seeking, and using feedback for performance improvement*. Routledge
- [26]. Nsamba, A & Makoe, M (2017). "Evaluating quality of students' support services in open distance learning", *Turkish Online Journal of Distance Education*, 18(4), 91-103.
- [27]. Nyongesa. T.N and Otieno. C (2020). Effect of integration of ICT infrastructure on effective teaching and learning in public primary schools IN Trans Nzoia County, Kenya. *International Journal of Recent Research in Commerce Economics and Management (IJRRCM)*. 7(2),1-22.
- [28]. Palloff, R. N., and Pratt .K (2018). *Building Online Learning Communities: Effective Strategies for the Virtual Classroom, 2nd Ed.* Jossey- Bass
- [29]. Passos.M.L.& Nunes .V.B (2016). Innovative Management in Distance Education: The Importance of Monitoring Meetings in a Postgraduate Course in the Multidisciplinary Team Perspective. *US-China Education Review* 6(1)63-69. <https://doi.org/10.17265/2161-623X/2016.01.006>
- [30]. Ratheswari. K (2025). Impact of ICT Usage and Academic Performance of High School Students in Chennai City. *International Journal on Science and Technology (IJSAT)*. 16(3), 1-7.
- [31]. Rozo-García .H & Ramírez-Montoya.M.S,(2025). Teaching and learning strategies in remote education: A systematic review of the literature. *Australasian Journal of Educational Technology*, 41(2), 71-88. <https://doi.org/10.14742/ajet.10070>

- [32]. Rumble, G. (2000). Student support in distance education in the 21st Century: Learning from service management. *Distance Education*, 21(2), 216-235
- [33]. Schullo, S., Venable, M., Barron, A. E., Kromrey, J. D., Hilbelink, A., & Hohlfeld, T. (2005). Enhancing online courses with synchronous software: an analysis of strategies and interactions. In National Educational Computing Conference, Philadelphia, Pa., June 26 -30.
- [34]. Sewart, D.; Keegan, D.; and Holmberg, B (1998). *Distance Education: International Perspectives, 1st ed.*; Routledge: Oxford, UK.
- [35]. Shabani, Omari & Kefiloe, A. (2021). The effectiveness and efficiency of student support services in open distance learning institutions in Africa: a desktop review. *African Perspectives of Research in Teaching & Learning-5* (2): 25-44
- [36]. Shi, H., Hur, J., Tang, Y. M., & Vanessa. (2023). Instructional Strategies for Engaging Online Learners: Do Learner-centeredness and Modality Matter?. *Online Learning*, 27(4). <https://doi.org/10.24059/olj.v27i4.4038>
- [37]. Tabe, Hennades T. (2025). "Exploring Teaching Strategies in Open Distance and e-Learning: Addressing Challenges, Embracing Innovations, and Identifying Best Practices: *International Teaching and Learning Conference. Progressio* 46 (7):1-17. <https://doi.org/10.25159/2663-5895/17452>.
- [38]. Tambo, L. J. (2012). *Principles and methods of teaching: Applications in Cameroon schools*. Limbe: ANUCAM Publishers.
- [39]. Tanyi, M. A. (2022). The Digital Environment and English Didactics in the Age of COVID-19 in Public Secondary Schools in Cameroon. *American Journal of Educational Research*. 10(1) 54-64. <https://doi.org/10.12691/education-10-1-6>.
- [40]. Usman, M and Abdulrazaq, M (2025). Impact of information and communication technology (ICT) on academic performance: a case study of selected tertiary institutions in Makurdi, Benue State. *Scholarly Journal of Science and Technology Research & Development* 4(1):1-22
- [41]. Usun, S (2004). Learner Support Services in Distance Education System (A Case Study of Turkey). *Turkish Online Journal of Distance Education-TOJDE*. 5(4)1-13
- [42]. Vonderwell, S. (2003). An examination of asynchronous communication experiences and perspectives of students in an online course: A case study. *The Internet and higher education*, 6(1), 77-90.
- [43]. Wagino, W., Maksun, H., Purwanto, W., Simatupang, W., Lapisa, R., Indrawan, E., et al. (2024). Enhancing learning outcomes and student engagement: integrating e-learning innovations into problem-based higher education. *Int. J. Interact. Mobile Technol. (IJIM)* 18, 106–124. doi: 10.3991/ijim.v18i10.47649
- [44]. Xu Z, Yang J, Zhang H and Liu T (2025) The impact of teachers' teaching strategies on students' deep learning in online learning environments: the mediating role of learning interaction. *Front. Educ.* 10:1680937. doi: 10.3389/educ.2025.1680937
- [45]. Yang, H. L., & Tang, J. H. (2003). Effects of social network on students' performance: a web-based forum study in Taiwan. *Journal of Asynchronous Learning Networks*, 7(3), 93-107.
- [46]. Zhao X, Shao M and Su Y (2022). Effects of Online Learning Support Services on University Students' Learning Satisfaction under the Impact of COVID-19. *Sustainability* 14(17), 10699; <https://doi.org/10.3390/su141710699>.