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### Abstract

**Purpose:** Using digital leadership in instructional practices, teachers may or may not empower every student to reach his or her full potential. Hence, the purpose of this study was to investigate the effects of teachers' digital leadership on students' learning outcomes in selected schools in the Mfoundi division-Cameroon. The objectives of the study were: To examine the effects of teachers' digital supervision of instruction on students' learning outcomes; and to find out the effects of teachers' digital communication on students' learning outcomes.

**Materials and Methodology:** The study adopted the descriptive survey design. From an accessible population of 220 teachers who held administrative positions (like principal, vice Principal, discipline master/ mistress and head of department), a sample size of 198 was deemed appropriate for the study. The purposive and simple random sampling techniques were used. Questionnaire was used as instrument to collect data. Cronbach's alpha coefficient for the questionnaire was 0.874. The data collected was

analyzed using descriptive and inferential statistics.

**Findings:** The ANOVA results indicated that teachers' digital supervision of instruction has statistically significant positive effect on students' learning outcomes ( $F=2263.7$ ,  $P$ -Value 0.000). Similarly, teachers' digital communication has statistically significant positive effect on students' learning outcomes ( $F=6917.1$ ,  $P$ -Value 0.000).

**Implications to Theory, Practice and Policy:** Based on the results recommendations were made which include that government should organize capacity building seminars focusing on the integration of technology into teaching learning activities for teachers and school administrators and, teachers should use technology devices to direct, coordinate, and monitor instructional practices so as to positively enhance students' learning outcomes and improve school success.

**Keywords:** *Teachers' Digital Leadership, Digital Supervision, Instruction, Digital Communication, Students' Learning Outcomes*

## 1.0 INTRODUCTION

When teachers use digital leadership to improve their practices students learn more. This simple but salient idea is at the heart of every proficient teacher. However, the challenge of every 21<sup>st</sup> century proficient teacher is to effectively integrate digital leadership in classroom practices. This is because digital leadership emphasizes the adoption of digital technologies and strategies to enhance educational processes and outcomes within educational organizations (Sağbaşı & Erdoğan, 2022). This means that teachers should be able to align technology initiatives with teaching -learning goals, objectives, content, resources, activities and assessment strategies. The reason for this is that students should feel active during the teaching learning process. Thus, this calls for the need to examine innovative training that focus on digital education that might provide students with contemporary skills.

In this regard, very little reflection is being directed to shape policy towards developing skills for the digital leadership or digital education as it is the case of Cameroon. For example, Fouda et al. (2013) posits that school principals and teachers do not undergo any form of professional training in the use of digital leadership that would enable them to take up their new responsibilities in the information age. Since no training is provided for school leaders and teachers, interested teachers seek training at African Institute of Computer Science and other institutions that offer digital training in the country (Djemeni, 2007). However, doubts may be raised on the effectiveness of the knowledge and skills teachers acquire after such training.

One of the most effective ideas to enhance teachers' knowledge and skills of digital leadership is digital leadership theory. Digital leadership theory emphasizes that digital leaders should combine their technology knowledge and skills with their leadership qualities to create a school culture that promotes the improvement, growth, and learning of school community members (Eberl & Drews, 2021; Sheninger, 2014). According to digital leadership theorists (Hughes et al. 2006; Kimmons, 2017) the integration of technology into school practices create possibilities for high-quality teacher professional development as well as, redesigning curriculum and pedagogical practices to enable student-based instruction that promotes digital competence.

Despite the advantages of digital leadership theories, there are some disadvantages. Abari et al. (2018) expressed the difficulties that students may face when teachers do not use digital supervision of instruction or use technology to direct, monitor, and coordinate teaching and learning activities. According to Siti et al. (2021) teachers may have difficulties supervising academic activities and utilizing information communication technology facilities in the form of Google Classroom, Google form, WhatsApp groups, Google Meet, and Telegram to carry out school supervision. Similarly, principals may have difficulties in utilizing different ways for communication and collaboration with teachers. For example, principals may find difficulties in using formal meetings, group collaboration, trainings, social media, website, online learning, digital teaching, personalized professional development, peers' modeling, digital management and digital data collection (Zhong, 2017). In this respect, Fouda et al. (2013) noted that out of over 1,000 secondary schools in Cameroon, only 100 have the necessary equipment to teach Computer Science.

They further exemplify that Yaounde, the political capital of Cameroon with a student population of 94,267, has only 1,159 computers giving a percentage of 81 students for 1 desktop. To them,

this yawning situation is still manifested in many schools in Yaounde and could be responsible for stagnation and low performance of schools during official examinations. Going by these arguments, one may wonder whether digital teachers have a positive effect on students' learning outcomes through improving and encouraging digital teaching and learning.

In order to improve the low level of digital leadership in Cameroon, the Ministry of Secondary Education (MINESEC, 2020), has laid a lot of emphasis on the digitalisation of education. Specifically, MINESEC has integrated virtual classes into official website. MINESEC has further emphasized on the digitalisation of education by adopting the slogan 'Digitalisation of Teaching and Learning' as theme for the 2022/2023 academic year (MINESEC, 2022). Based on this reform the needs, goals and learning outcomes of students have also changed over the years. For instance, students are often educated on skills revolution based on science, technology and innovation (National Development Strategy for Cameroon, 2030). This implies that nowadays, students should have quick and easy access to information and actively participate during the teaching learning process. From this perspective the importance of digital leadership in improving today's education is critical to developing the type and nature of skills needed by today's job market, not exempting Mfoundi division in Cameroon.

The successful implementation of digital leadership rest on several factors such as: teachers' application of digital leadership theories, teacher's vision, competence, and willingness to embrace innovation (like digital supervision of instruction and digital communication), availability of resources, professional development opportunities for teachers, a supportive policy environment amongst other factors. However, empirical studies in Cameroon (Tetang, 2007; Mbangwana. 2008; Nkwenti 2015) reveal that a key factor that affects the process of digital leadership is teachers little or no specific technology knowledge and skills, technology pedagogical knowledge as well as technology related classroom management knowledge. Based on this insight, it is questionable if the use of digital leadership as an innovation in education depends on teachers' abilities to use technology or on how they feel about its benefits.

### **Statement of the Problem**

The problem of this study emanates from the fact that, there is a general dissatisfaction amongst teachers who hold posts of responsibility, due to absence of adequate pre-service or in-service training opportunities in digital leadership and insufficient digital resources in schools. These loopholes are epitomised in teachers' behaviour such as lack of specific technology knowledge and skills. This drastically abridges the emphasis on the digitalisation of education. As a consequence, it seriously comprises the learning outcomes of students.

It is against this backdrop, that this study lays emphasis on the effect of teachers' digital leadership on students learning outcomes. It goes further to find out which digital leadership factors positively affects students learning outcomes. It equally makes proposal to: teachers, principals, vice principals, discipline masters/mistresses and Ministry of Secondary Education (MINESEC) on the possible ways of ameliorating the situation of teachers lack of digital competence and improving students learning outcomes or school success. Therefore, the findings of this study would be beneficial to all students, teachers and school administrators in Mfoundi Division in particular and Cameroon in general.

## Research Questions

This study attempts to provide an answer to the following research questions:

- How does teachers' digital leadership affect students' learning outcomes in Mfoundi Division?
- Specifically,
- What are the effects of teachers' digital supervision of instruction on students' learning outcomes in Mfoundi Division?
- How does teachers' digital communication affect students' learning outcomes in Mfoundi division?

## 2.0 LITERATURE REVIEW

From a conceptual perspective, Tian et al., (2020) referred to digital leadership as one of the most appropriate, fast, cross-hierarchical, workgroup-oriented and collaborative approaches focusing on innovation. Today' teachers' digital leadership is defined as the administrator successful integration of digital technologies into the functioning and improvement of organizations (Karakose et al., 2021). According to this study, teachers' digital leadership is described as teachers' ability to establish a technology-friendly culture that fosters the development of a positive relationships and structural improvement in pedagogical and school management practices. This implies that teachers' digital supervision of instruction and teachers' digital communication are components of teachers' digital leadership.

Precisely, digital supervision of instruction is defined by Abari et al., (2018) as that which involves using technology to direct, monitor, and coordinate teaching and learning activities. Whereas McCleskey (2014), refers to digital communication as the use of technology devices to deliver information or digital communication is any form of electronic communication that includes email, text messaging, video conferencing, live chats, blogs, voicemail among others to deliver information. This implies that digital communication can be written, verbal, visual or audible communication. The term students' learning outcomes refer to knowledge, skills and abilities individual students should possess and can demonstrate upon completion of a learning experience (Linn & Miller, 2005). Alternatively, students' learning outcomes is defined as continuous dialogue between students, teachers and principals to support teachers' development and students' growth throughout the year (Thompson et al., 2021). Surmising from both definition students' learning outcomes describe the specific measurable knowledge, values or skills that students will be able to demonstrate to prove that the program is making progress towards their goals.

The guiding theories for this paper are the replacement, amplification transformation (RAT) theory and the substitution, augmentation, modification and redefinition (SAMR) theory on technology integration (Kimmons, 2017). The RAT theory is preferred because of its assumption that when technology is used in the teaching learning process, technology is used either to replace a traditional approach (without any visible difference on student outcomes). This theory also addresses the relevance of an individual preference and responsibilities to amplify the learning that was occurring or to transform it in ways that were not possible without the use of technology (Hughes et al., 2006). Similarly, the SAMR theory is valuable because it focuses on the use of

technology that enables teachers and students to improve learning outcomes (Puentedura, 2014) through small improvement (referred to as augmenting) or large improvement (known as modification).

Empirically, O'Shea (2021) noted that the leadership quality of the principal will affect the teachers. In another study, Richerson (2018) argues that digital leadership is closely related to educational supervision of instruction as it supports the integration of appropriate technologies in routine educational supervisory activities. Supervisory tasks like scaffolding student learning and teaching through integrating technology in the day-to-day activities of educators, including educational supervisors, can help students, teachers and other stakeholders to constructively affect students learning outcomes. Richerson (2018) concluded that, to enhance students learning outcomes, teachers should demonstrate proactive leadership by being visionary and using hands-on activities in addressing related challenges. In a further twist, Zhong (2017) results indicated that, increase support and vision for technology plans and integrated technology by educational stakeholders are key markers of visionary and digital leadership in education. Whereas, Ahlquist (2017) findings indicated that when teachers integrate technology into supervision of instruction, they can facilitate the adoption of digital reflection models through which they can assess abstract conceptualization, reflective observation and concrete experience of students.

In a nutshell, a handful of the existing studies have revealed positive associations between digital leadership and students' academic performance. Surprisingly earlier studies perceive leadership as key to innovative transformations in education given its potential to enrich learning and teaching (Sheninger, 2014). Moreover, previous studies in Cameroon (Tetang, 2007; Mbangwana, 2008; Nkwenti 2015) are not current on the issue under study. Thus, a critical appraisal of literature indicates that no study has explicitly analyzed the effects of teachers' digital leadership on students' learning outcomes in Mfoundi Division- Cameroon. This study intends to fill this gap.

### 3.0 MATERIALS AND METHODS

The effects of teachers' digital leadership on students' learning outcomes in Mfoundi Division-Cameroon was examined using a descriptive survey research design. The design was deemed appropriate because the entire population was studied through the means of collecting and analyzing data only from the sample of the population that was considered to be the representative of the entire population and then the result was generalized on the entire population. The target population for this study was consisted of 1059 secondary school and 8290 teachers in Mfoundi Division. According to the Divisional Delegation for Secondary School for Mfoundi Statistical Record 2023-2024 academic year the target population of teachers consisted of 1619 teachers from Yaoundé I (Nlongkak), 480 teachers from Yaoundé II (Tsinga), 2394 teachers from Yaoundé III (Efulan), 1487 teachers from Yaoundé IV (Kondengui), 683 teachers from Yaoundé V (Essos), 957 teachers from Yaoundé VI (Biyem-Assi), 670 teachers from Yaoundé VII (Nkolbisson).

From the target population an accessible population of 220 teachers who were administrators was selected. Specifically, the purposive sampling technique was used to select the accessible population of 70 principals, 50 vice principal 50 discipline masters and 50 head of departments from all the 7 Sub-Division in Mfoundi Division-Cameroon. Simple balloting without replacement was used to select 13.1% (26) teachers from Yaoundé I sub-division, 16.2% (32) teachers from

Yaoundé II sub-division, 14.1% (28) teachers from Yaoundé III sub-division, 13.6% (27) teachers from Yaoundé IV sub-division, 16.7% (33) teachers from Yaoundé V sub-division, 13.1% (26) teachers from Yaounde VI sub-division and 13.1% (26) teachers from Yaounde VII sub-division. Thus, the sample size was 198 teachers with 33.8% (67) being male teachers who were administrators and 66.2% (131) being female teachers who were administrators.

A 20-item questionnaire made up of close ended questions was administered to the teachers by the researcher. The questionnaire consisted of section A and B. Section A was designed to collect demographic characteristics such as age and longevity of service of the respondents. Section B was further divided into two areas. Each area contained ten statements focusing on effects of teachers' digital supervision of instruction and teachers' digital communication on students learning outcomes. Generally, section B contained statements on the effects of teachers' digital leadership on students' learning outcomes. The questionnaire had an advantage because it was presented first to some teachers who were not part of the sample population to improve face and content validity.

The Cronbach's alpha coefficient was 0.874, implying that the average correlation between the items was high thus, good enough for the instrument to be considered reliable. Statistical Package for Social Sciences (SPSS) version 29 (SPSS v.29.0) was used for statistical analysis. Two research hypotheses were formulated to guide the study.

H<sub>01</sub>: Teachers' digital supervision of instruction has no significant effect on students' learning outcomes in Mfoundi Division-Cameroon.

H<sub>02</sub>: Teachers' digital communication has no significant effect on students' learning outcomes in Mfoundi Division-Cameroon.

These hypotheses were tested using the analysis of variance (ANOVA) test at a 0.05 alpha level.

All ethical issues were identified and considered. Particularly, prior to initiating the data collection process, the researchers obtained permission from the administration of NFONAP Higher Institute for Educational and Professional Studies to distribute the questionnaire. Additionally, consent was sought from the Delegate of secondary education for Mfoundi and the principals of the schools in Mfoundi Division where the instrument was administered. The study ensured that the personal information of the respondents remained confidential, the purpose of the study was disclosed to avoid deception. The participants were fully informed about the ability to willingly participate in the study and to demonstrate high levels of collaboration given that the research was carried out in anonymity.

#### 4.0 FINDINGS

The results of demographic profile and descriptive statistics of the respondents are presented in Table 1, 2, 3 and 4.

**Table 1: Age of the Respondents**

Age	Frequency	Percent
Below 30	52	26.3
31- 40 Years	115	58.1
41-50 Years	24	12.1
51 and Above	7	3.5
<b>Total</b>	<b>198</b>	<b>100.0</b>

Table 1 reveals that majority 58.1% (115) of the respondents are between 31 to 40 years of age. This is followed by 26.3% (52) of the respondents being below 30 years of age and 12.1% (24) of them being between 41-50 years of age. A handful 3.5 % (7) of the respondents are above 51 years.

**Table 2: Longevity of Service of the Respondents**

Longevity	Frequency	Percent
Below 10years	143	72.2
11-20 Years	38	19.2
31-30 Years	8	4.0
Above 31 Years	9	4.5
<b>Total</b>	<b>198</b>	<b>100.0</b>

Table 2 shows that majority 72.2% (143) of the respondents have work for below 10 years as teachers, 19.2% (38) of the respondents have work for 11 to 20 years, 4.0% (8) of the respondents have work for 21 to 30 years while 4.5% (9) of them have work for 31 years and more.



**Table 3: Descriptive Statistics Showing Teachers' Digital Supervision of Instruction and Students' Learning Outcomes**

S/N	Statements	SA F(%)	A F(%)	D F(%)	SD F(%)	Mean	Std. Dv
1	Digital instructional supervision helps me to foster students' acquisition of knowledge.	29 (14.6)	44 (22.2)	114 (57.6)	11 (5.6)	2.46	0.81
2	Digital tools enable me coordinate supervision visits that enhance students' learning of skills.	102 (51.5)	47 (23.7)	31 (15.7)	18 (9.1)	3.18	1.00
3	Due to the use of digital supervision techniques, I find myself directing teaching learning activities that fosters students' learning of values.	126 (63.6)	49 (24.7)	15 (7.6)	8 (4.0)	3.48	0.80
4	I use video surveillance systems to monitor teaching learning activities to see if students demonstrate specific knowledge taught.	40 (20.2)	46 (23.2)	102 (51.5)	10 (5.1)	2.59	0.87
5	I enjoy using digital supervision of instruction to monitor how resources are use during teaching learning activities to foster students' demonstration of skills.	46 (23.2)	45 (22.7)	89 (44.9)	18 (9.1)	2.60	0.94
6	Digital supervision of instruction enables me direct teachers who do not accept to use digital supervision techniques in teaching learning activities.	34 (17.2)	22 (11.1)	95 (48.0)	47 (23.7)	2.22	1.00
7	Digital supervision of instruction can positively affect students' growth.	38 (19.2)	48 (24.2)	96 (48.5)	16 (8.1)	2.55	0.89
8	Frequent digital supervision of instruction does not improve students' educational learning outcomes in my school.	46 (23.2)	45 (22.7)	92 (46.5)	15 (7.6)	2.62	0.93
9	Online supervision of instruction cannot be effectively used to evaluate school programs.	32 (16.2)	39 (19.7)	101 (51.0)	26 (13.1)	2.39	0.91
10	Online supervision of instruction is an important factor that can consistently improve school success.	27 (13.6)	40 (20.2)	111 (56.1)	20 (10.1)	2.37	0.84
<b>Total</b>		<b>945 (47.7)</b>		<b>1035 (52.3)</b>		<b>2.65</b>	<b>0.90</b>

Table 3 shows the responses regarding the effects of teachers' digital supervision of instruction on students' learning outcomes. Item 1 shows that, only 22.2% of the teachers generally agreed that digital instructional supervision helps them to foster students' acquisition of knowledge. Whereas, Item 2 shows that 51.5% of teachers strongly agreed that digital tools enable them to coordinate supervision visits that enhance students' learning of skills. Item 3 shows that 63.6% of teachers strongly agreed with the notion that, they use of digital supervision techniques enables them to direct teaching learning activities that fosters students' learning of values. However, Item 4 shows that 51.5% of the teachers disagreed using video surveillance systems to monitor teaching learning activities to see if students demonstrate specific knowledge taught. With regards to item 5, only 23.2% of the respondents strongly supported the notion that they enjoy using digital supervision of instruction to monitor how resources are use during teaching learning activities to foster

students' demonstration of skills. Nevertheless, 48.0% of teachers disagreed that digital supervision of instruction enables them to direct teachers who do not accept to use digital supervision techniques in teaching learning activities. Similarly, 48.5% of the teachers disapproved of the fact that, digital supervision of instruction can positively affect students' growth. While only 24.2 % of them agreed that digital supervision of instruction can positively affect students' growth. Interestingly, 23.2 % of the teachers strongly agreed that frequent digital supervision of instruction does not improve students' educational learning outcomes in their school. Moreover, 51.0% and 56.1% of the teachers disagreed that online supervision of instruction cannot be effectively used to evaluate school programs but it is an important factor that can consistently improve school success. Generally, 47.7% of the teachers strongly agreed and agreed that teachers' digital supervision of instruction has an effect on students' learning outcomes as opposed to 52.3% of them.

**Table 4: Descriptive Statistics Showing Teachers' Digital Communication and Students' Learning Outcomes**

S/N	Statements	SA F(%)	A F(%)	D F(%)	SD F(%)	Mean	Std. Dv
1	To foster students' acquisition of knowledge, I used social media tools like WhatsApp to improve collaboration with teachers and students.	48 (24.2)	45 (22.7)	85 (42.9)	20 (10.1)	2.61	0.96
2	I prefer digital communication via social networking because it promotes effective decision making that fosters learning.	51 (25.8)	45 (22.7)	94 (47.5)	8 (4.0)	2.70	0.90
3	To enhance students' learning of skills, I use digital tools such as blogging to communicate with teachers and students.	27 (13.6)	39 (19.7)	124 (62.6)	8 (4.0)	2.43	0.78
4	Due to the use of social media and internet facilities, I find myself training teachers and students on how to use digital communication that fosters students' learning of values.	38 (19.2)	33 (16.7)	104 (52.5)	23 (11.6)	2.43	0.93
5	I enjoy using digital communication via voicemail to provide effective feedbacks to students and teachers.	34 (17.2)	52 (26.3)	104 (52.5)	8 (4.0)	2.57	0.82
6	I use digital communication tools to limits interaction in the learning community.	54 (27.3)	42 (21.2)	99 (50.0)	3 (1.5)	2.74	0.88
7	I cannot use digital tools effectively to communicate which negatively affects students' growth.	32 (16.2)	49 (24.7)	106 (53.5)	11 (5.6)	2.52	0.83
8	Digital communication techniques can positively affect students' learning outcomes.	48 (24.2)	48 (24.2)	94 (47.5)	8 (4.0)	2.69	0.89
9	Teachers' communication through digital tools provides fast coverage of school program.	38 (19.2)	28 (14.1)	100 (50.5)	32 (16.2)	2.36	0.97
10	Teachers' communication through digital tools can hinder and slow innovative initiatives directed toward improving school success.	46 (23.2)	25 (12.6)	104 (52.5)	23 (11.6)	2.47	0.98
<b>Total</b>		<b>822 (41.5)</b>		<b>1158 (58.5)</b>		<b>2.55</b>	<b>0.89</b>

Table 4 shows the responses regarding the effects of teachers’ digital communication on students’ learning outcomes. Item 1 shows that, only 24.2% of the teachers strongly agreed that, they used social media tools like WhatsApp to improve collaboration with teachers and students which fosters students’ acquisition of knowledge. Similarly, Item 2 shows that 25.8% of teachers strongly agreed that they prefer digital communication via social networking because it promotes effective decision making that fosters learning. Item 3 shows that 19.7% of teachers agreed with the notion that, they used digital tools such as blogging to communicate with teachers and students which enhances students’ learning of skills. However, Item 4 shows that 52.5% of the teachers disagreed that due to the use of social media and internet facilities, they find themselves training teachers and students on how to use digital communication that fosters students’ learning of values.

With regards to item 5, only 26.3% of the respondents supported the notion that they enjoy using digital communication via voicemail to provide effective feedbacks to students and teachers. Interestingly, 27.3% of teachers strongly agreed that they used digital communication tools to limits interaction in the learning community. Similarly, 53.5% of the teachers disapproved of the fact that, they cannot use digital tools effectively to communicate which negatively affects students’ growth. While only 24.2 % of them accepted that digital communication techniques can positively affect students’ learning outcomes. Moreover, 50.5 % and 52.5 % of the teachers disagreed that teachers’ communication through digital tools provides fast coverage of school program, hinder and slow innovative initiatives directed toward improving school success. Generally, 41.5% of the teachers strongly agreed and agreed that teachers’ digital communication has an effect on students’ learning outcomes as opposed to 58.5% of them.

Verification of hypotheses on the effects of teachers’ digital leadership on students’ learning outcomes in Mfoundi Division-Cameroon are presented in table 5,6,7,8,9 and 10.

**Table 5: Model Summary of Teachers’ Digital Supervision of Instruction (TDSI) as a Predictor of Students’ Learning Outcomes (SLO)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.959 <sup>a</sup>	.920	.920	.23849

a. Predictors: (Constant), TDSI

Pearson’s product correlation indicated a highly positive relationship between teachers’ digital supervision of instruction and students’ learning outcomes was statistically significant ( $r = .959$ ,  $p < 0.01$ ). The regression model predicted 92.0% of variance and the model was a good fit for the data.

**Table 6: ANOVA Results of Teachers’ Digital Supervision of Instruction (TDSI) as a Predictor of Students’ Learning Outcomes (SLO)**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	128.757	1	128.757	2263.763	.000 <sup>b</sup>
	Residual	11.148	196	.057		
	<b>Total</b>	<b>139.905</b>	<b>197</b>			

a. Dependent Variable: SLO

b. Predictors: (Constant), TDSI

Table 6 reveals that, there is a significant effect of teachers’ digital supervision of instruction on students’ learning outcomes ( $F= 2263.763$ ;  $P< 0.000$ ). Thus, the null hypothesis that teachers’ digital supervision of instruction has no significant effect on students’ learning outcomes in Mfoundi Division-Cameroon is rejected.

**Table 7: Coefficient of Teachers’ Digital Supervision of Instruction (TDSI) as a Predictor of Students’ Learning Outcomes (SLO)**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.280	.060		-4.641	.000
	TDSI	1.008	.021	.959	47.579	.000

a. Dependent Variable: SLO

These results indicate that there is a significant effect of teachers’ digital supervision of instruction on students’ learning outcomes scores, with a t-value of 47.579 and p-value less than 0.01. The slope coefficient (beta value) for teachers’ digital supervision of instruction is 0.959, suggesting that for every unit change in teachers’ digital supervision of instruction, students’ learning outcomes scores increase by 0.959. Additionally, with a t-value greater than 1.96, the null hypothesis is rejected, indicating that there is a statistically significant effect of teachers’ digital supervision of instruction on students’ learning outcomes in Mfoundi Division.

**Table 8: Model Summary of Teachers’ Digital Communication (TDC) as a Predictor of Students’ Learning Outcomes (SLO)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986	.972	.972	.14024

a. Predictors: (Constant), TDC

Pearson’s product correlation indicated a highly positive relationship between teachers’ digital communication and students’ learning outcomes and it was statistically significant ( $r= .986$ ,  $p < 0.01$ ). The regression model predicted 97.2% of variance and the model was a good fit for the data.

**Table 9: ANOVA Results of Teachers’ Digital Communication (TDC) as a Predictor of Students’ Learning Outcomes (SLO)**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	136.050	1	136.050	6917.187	.000 <sup>b</sup>
	Residual	3.855	196	.020		
	<b>Total</b>	<b>139.905</b>	<b>197</b>			

a. Dependent Variable: SLO

b. Predictors: (Constant), PDC

Table 9 indicates that, there is a significant effect of teachers’ digital communication on students’ learning outcomes ( $F= 6917.187$ ;  $P< 0.000$ ). Thus, the null hypothesis that teachers’ digital communication has no significant effect on students’ learning outcomes in Mfoundi Division-

Cameroon is rejected.

**Table 10: Coefficient of Teachers’ Digital Communication (TDC) As a Predictor of Students’ Learning Outcomes (SLO)**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.086	.032		-2.658	.009
	PDC	.990	.012	.986	83.170	.000

a. Dependent Variable: SLO

The regression results in Table 10 indicate that there is a significant effect of teachers’ digital communication on students’ learning outcomes scores. The t-value of 83.170 and p-value of less than 0.01 demonstrate the strong statistical significance of this relationship. The slope coefficient, also known as the beta value, for teachers’ digital communication is 0.986. This means that for every unit increase in teachers’ digital communication, students’ learning outcomes is expected to increase by 0.986 units.

### Discussion of Results

The respondents to this study were teachers who held administrative positions as principals, vice principal, discipline masters/mistresses and head of departments. The study reveals that the digital leadership applied by the teacher positively and significantly affects students’ learning outcomes. Specifically, the results obtained in hypothesis 1, revealed that teachers’ digital supervision of instruction has statistically significant effect on students’ learning outcomes. This implies that integrating technology into supervision enables teachers to direct, coordinate and monitor instruction which enhances students’ acquisition of knowledge, skills and demonstration of values taught. These findings are in conformity with the findings of Abari et al., (2018), Richerson (2018) and Sheninger (2014) that supervisory tasks like scaffolding student learning and teaching through integrating technology in the day-to-day activities, helps students and teachers to constructively improve students’ learning outcomes.

The demographic profile findings in table 1 and 2 as well as the descriptive statistics in table 3 corroborated the above results. This suggest that both teachers age and longevity in service alongside teachers’ integration of technology into supervision of instruction positively affects students’ growth and consistently improve school success. These findings were in congruence with those of AlAjmi (2022), Karakose et al., (2021) and Ahlquist (2017) findings that when teachers integrate technology into supervision of instruction, they improve students’ achievement and school success.

The descriptive findings in table 3 stated that, 47.7% of the teachers accepted that teachers’ digital supervision of instruction has an effect on students’ learning outcomes as opposed to 52.3% of them who refused. This implies that, teacher’s integration of technology in teaching learning activities during instructional supervision brings about small and large improvements in students’ learning outcomes. This finding is in agreement with the substitution, augmentation, modification and redefinition (SAMR) theory on technology integration (Puentedura, 2014).

Furthermore, the results obtained in hypothesis 2, indicated that teachers’ digital communication

has statistically significant effect on students' learning outcomes. This means that integrating digital leadership or technological tools into teaching learning activities promotes students' acquisition of knowledge, skills and demonstration of values taught. These findings are similar to Karakose et al., (2021) arguments that digital leadership leads to innovative practices since teachers are compelled to use digital tools in the teaching learning process which enhances students' learning.

The descriptive statistics in table 4 strongly supports the above findings with the reason that teacher's integration of technology into verbal communication, non-verbal communication, listening, written communication and visual communication provides effective feedback, fast coverage of school program and positively affects students' learning outcomes. This might be why O'Shea (2021) noted that the leadership quality of the principal will affect the teachers' performance and will further determine the school's success in achieving learning objectives.

The descriptive findings in table 4 have also indicated that teachers in Mfoundi Division have utilized various digital tools that could enhance students' acquisition and demonstration of knowledge, skills and values. These tools included: WhatsApp, social networking, blogging, voicemail, among others. These findings are consistent with those of McCleskey (2014) and Zhong (2017) which indicated that principals utilized hybrid ways for communication and collaboration with teachers that includes email, text messaging, video conferencing, live chats, blogs, voicemail among others to deliver information.

The study found that, 41.5% of the teachers generally agreed that teachers' digital communication has an effect on students' learning outcomes as opposed to 58.5% of them that disagreed. This means that there is no visible difference on students' learning outcomes due to teachers' usage of technology in the teaching learning process. Replacement, amplification transformation (RAT) theory on technology integration reaffirms these findings (Hughes et al., 2006; Kimmons, 2017).

### **Educational Implications**

Digital teachers always ensure that the organization can flexibly adapt processes to support innovative ways of meeting the goals of the organization. Therefore, the educational implications of the findings of this study are that:

1. Teachers' digital leadership helps teachers and students to keep with ever changing trend and makes them smarter. Teachers' digital leadership further enhances knowledge, skills and values in learners and promotes school success. Thus, the integration of technology in teaching learning activities in secondary schools is required.
2. Teachers' digital supervision of instruction improves classroom interaction, makes students more accountable and as a result fosters students' demonstration of knowledge, skills and values. Therefore, to guarantee deeper involvement of teacher and better engagement of students the integration of technology in supervision of teaching learning activities in secondary schools is necessary.

3. Teachers' digital communication advances classroom collaboration, makes students acquainted with digital tools, provides them with easy access to information and as a result facilitates students' demonstration of knowledge, skills and values. Hence, the adaptation of different digital tools and techniques in the communication of teaching learning activities in secondary schools is needed.

## 5.0 CONCLUSION AND RECOMMENDATIONS

Teachers' digital leadership is one of the most recent and effective innovations in education that could enhance students' acquisition of knowledge, skills and values. This assessment seems to have been proven by the findings of this study. Specifically, through the integration of technology by teachers in instructional supervision learning could become more collaborative and engaging. In addition, through the integration of technology by teachers in communication learning could become motivating to students. Therefore, to improve students' learning outcomes in Mfoundi Division this study recommends as follows:

1. That teachers who hold posts of responsibility as principals, vice principals, discipline masters/mistresses and heads of departments should integrate technology in instructional supervisory practices.
2. That teachers who hold posts of responsibility as principals, vice principals, discipline masters/mistresses and heads of departments should ease the flow of information by integrating technological tools in teaching learning process.
3. That teachers who hold posts of responsibility as principals, vice principals, discipline masters/mistresses and heads of departments should constantly attend digital leadership seminars and workshops organized by the Ministry of Secondary Education.



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